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MONTESSORI PRE-SCHOOL EDUCATION. FINAL REPORT.

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DESCRIPTORS- *COMPARATIVE ANALYSIS, DATA ANALYSIS, FACTOR ANALYSIS, DISCRIMINANT ANALYSIS, ACADEMIC ABILITY, VERBAL ABILITY, *ACADEMIC PERFORMANCE, STUDENT ADJUSTMENT, *PRESCHOOL CHILDREN, *PRESCHOOL PROGRAMS, *EARLY CHILDHOOD EDUCATION, CONTROL GROUPS, BEHAVIOR DEVELOPMENT, PROGRAM EFFECTIVENESS, TESTING PROBLEMS, MEASUREMENT INSTRUMENTS, MONTESSORI, PRESCHOOL OUTCOMES RATING SCALE,

IN ORDER TO INVESTIGATE THE EFFECTIVENESS OF MONTESSORI PRESCHOOL EDUCATION AS COMPARED WITH NON-MONTESSORI PRESCHOOL EDUCATION, PHASE I OF THIS STUDY MATCHED 2 GROUPS, EACH OF 21 PRESCHOOL CHILDREN, ON INTELLIGENCE QUOTIENT AND CERTAIN SOCIO-ECONOMIC FACTORS. ONE GROUP ATTENDED A MONTESSORI PRESCHOOL AND THE OTHER A NON-MONTESSORI PRESCHOOL. THE CHILDREN WERE ADMINISTERED TESTS NEAR THE BEGINNING AND END OF THE PRESCHOOL YEAR TO DETERMINE ANY DIFFERENCES IN ACHIEVEMENT DUE TO THE PRESCHOOL TRAINING. IN PHASE II A TRAINED RESARCHER INTERVIEWED THE PRIMARY GRADE TEACHERS WHO BY THEN HAD SOME OF THE PRESCHOOL CHILDREN OF PHASE I IN THEIR CLASSROOMS. RATINGS OF THESE TEACHERS PROVIDED INFORMATION ON THE PERSONALITY AND ABILITY OF 3 GROUPS OF CHILDREN, (1) FORMER MONTESSORI PRESCHOOL CHILDREN, (2) FORMER NON-MONTESSORI PRESCHOOL CHILDREN, AND (3) NON-PRESCHOOL CHILDREN. THE CHILDREN WERE RATED ON 8 MAJOR TRAITS WHICH CONTAINED 27 STIMULUS VARIABLES. PHASE I DATA INDICATED THAT MONTESSORI PRESCHOOL CHILDREN GAINED SIGNIFICANTLY MORE IN VERBAL ABILITY THAN NON-MONTESSORI PRESCHOOL CHILDREN. PHASE II DATA INDICATED THAT MONTESSORI CHILDREN WERE SUPERIOR TO THE CHILDREN OF THE OTHER 2 GROUPS IN READING READINESS, INTEREST IN LEARNING, INDEPENDENCE, INTERPERSONAL RELATIONS, LEADERSHIP, AND LEARNING ABILITY. NO DIFFERENCES WERE FOUND IN CREATIVITY OR ABILITY TO ADJUST TO THE TRADITIONAL-TYPE SCHOOL. (WD)

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MONTESSORI PRE-SCHOOL EDUCATION

PROJECT 5-1061
GRANT NO. OE 3-10-127

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Chapter I

INTRODUCTION

CHAPTER I -- INTRODUCTION

A. Background, Objectives, Hypotheses.

This study falls within the general problem of finding more effective ways of preparing pre-school age children for their initial formal learning experience in school.

Since the Montessori approach to educating the young child emphasized a triad of the child, the environment and the teacher, the investigator's hypothesized certain outcomes. Montessori underscores: 1) The interests and inner needs of the developing child as a unique person (not a miniture adult), 2) a prepared environment consisting of programed materials designed to confront the child with discovery tasks geared to his previous experience, and 3) the catalytic role of the teacher functioning as a directress, bringing the child into contact with appropriate elements in the school environment.

In 1963 when the authors began this project there were no studies underway nor were there any in the literature reporting statistically on the comparative effectivness of Montessori pre-school programs. Personal opinions, pro and con, based in some instances on observation were quite prevalent

The theoretical considerations, such as those of J McVicker Hunt[1], based on pre-school childrens' learning experiments, pointed to the possible effectiveness of stimulating pre-school programs rich in informational content, provided they constituted a "match" for the very young child's need to manipulate, discover and learn.

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[1] J. McVicker Hunt, "The Psychological Basis for Using Pre-school Enrichment as an Antidote for Cultural Deprivation," The Merrill-Palmer Quarterly, July, 1964; Also Intelligence and Experience (New York: Ronald Press, 1961).

The Early School Admissions and Training Projects,[2] such as those of Catherine Brunner in Baltimore, Rupert Klaus in Murfullsburo and the Perry Preschool Project in Ypsilanti where being discussed and launched. The work of Martin and Cecelia Deutsch and others with the culturally disadvantaged child as well as the research on perceptual development and early learning[3] pointed to the possible advantages which might exist in a carefully programmed set of learning experiences such as those characteristic of the Montessori prepared environment.

The work of Riley W. Fardner and his colleagues, in the Cognition Project at the Menninger Foundation[4] underscores "the partial concatenation of Montessori's insights and (.the) elaborate general theory of development created by Piaget." Consequently the investigators set out to explore through a variety of evaluative measures the relative effectiveness of a Montessori program in achieving an intensive list of learning outcomes.

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[2] U.S. Department of Health, Education and Welfare, Childrens Bureau, Research Relating To Children, Bulletins No: 15,16, and 17.

[3] Harold W. Stevenson, (ed.) et.al., Child Psychology, Sixty-Second Yearbook of the National Society for the Study of Education, Part I (Chicago: University of Chicago Press (Dist.), 1963).

[4] R.W. Gardner, P.S. Halgman, G.S. Klein, Harriet B. Linton, and D.P. Spence, "Cognitive Control: A Study of Individual Consistencies in Cognitive Behavior," Psychological Issues, 1959,1,No:4; also R.W Gardner, N.D. Jackson and S.J.Massick, "Personality Organization in Cognitive Controls and Intellectual Abilities," Psychological Issues, 1960, 2,No:8.

The authors hypothesized that in a comparative study of Montessori with non-Montessori pre-school trained children, all having attended pre-school programs for a comparable time: 1) The Montessori pre-school children would show a more positive attitude toward learning (show more initiative, persistence, ability to concentrate, be more cooperative, insightful, independent... in brief, possess the qualities conducive to learning in a classroom situation).

2) The Montessori pre-school children would show better sensori-motor coordination.

3) The Montessori pre-school children would show superiority in verbal activity, such as in self-expression, sentence use, communication skill, vocabulary, grasp of verbal symbols, insight into meanings.

4) The Montessori pre-school children would have greater facility with and interest in numbers and their comprehension.

A second phase of hypotheses were also projected, to be verified in a later follow-up study as these children progressed up through the grades. These hypotheses anticipated a continuation of an initial superiority in the basics of learning in so far as these foundational attitudes and study habits entered into school performance. The authors hypothesized that Montessori trained children would manifest greater facility in academic learning and be less dependent on the teacher. It was also hypothesized that these children would have some adjustment problems in transferring to traditional schools and tend to become bored where learning was predominantly through group process.

With the benefit of hindsight, therefore, the authors present the report of efforts which turned out to be primarily exploratory. In evaluating the more difficult to define outcomes more dead-ends were found than open avenues leading to clean-cut conclusions. This was mainly because of difficulty in developing a) adequate measuring devices for these behaviors and b) satisfactory, controlled observation criteria with sufficiently narrow meanings to be interpreted identically by the same reporters (the teachers, and parents interviewed). The more easily defined outcomes, such as vocabulary size, sentence use and similar verbal ability indicators were more easily evaluated and consequently the findings in this area of outcomes merit greater confidence than the evaluations of certain more-difficult-to-identify outcomes in measurable terms such as attitude toward learning.

B. Socio-Economic Discription of the Community

The community in which this project was carried out has a population of some 61,000 people U.S. Census Figures for 1960 show that the average number of families in 16,440 with the average family size being 2.88 members.[5] The median age in the community is 40.

Family income in the community is generally high. Only 9.3 percent of the families average an income of less than $4,000 per annum. This compares with 20.35 percent of Chicago families in this low income bracket.[6]

The following breakdown shows the other distributions of income in the community:[7]

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[5] U.S. Bureau of the Census, U.S. Census of Population: 1960. Volume I, Characteristics of the Population, Part 15, Illinois.

[6] U.S. Bureau of the Census, U.S. Census of Population and Housing: 1960, Census Tracts, Final Report PHC (1) -27. U.S. Government Printing Office, Washington, D.C. 1962

[7] U.S. Bureau of the Census, U.S. Census of Population : 1960. Volume I, Characteristics of the Population, Part 15, Illinois. Table 76, page 342.

$ 5,000 to 8,000/yr.	approx 4,040 families
$ 8,000 to 10,000/yr.	approx 3,000 families
$10,000 to 15,000/yr.	approx 4,000 families
$15,000 to 25,000/yr.	approx 2,200 families
$25,000 to above/ yr.	approx 1,000 families

The community has some 13,200 individuals between the ages of 5 and 34 years enrolled in educational institutions.

The median school years completed by male members of the community is 12.7 years.[8] Female average number of years completed is 12.4. Over 4,440 males and 3,300 females completed more than four years of college. In Chicago the median education level is 10 years.

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[8] U.S. Bureau of the Census, U.S. Census of Population: 1960. Volume I, Characteristics of the Population, Part 15, Illinois. Table 73, page 303.

Chapter 2

METHODS and PROCEDURES

CHAPTER 2 -- METHODS AND PROCEDURES

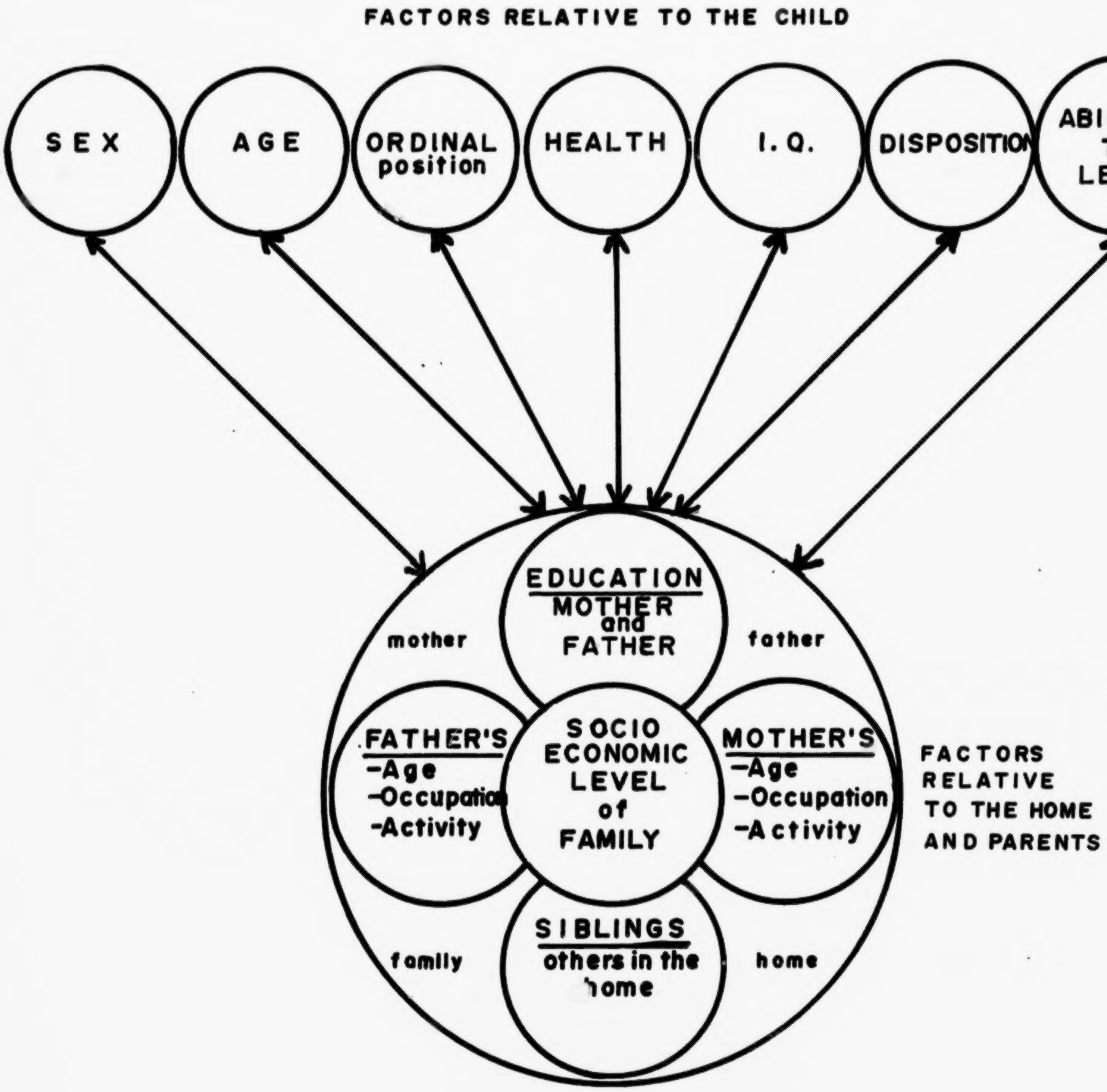
A. Design of Study, Phase 1

Phase I of the project consisted of two matched groups of 25 children each. The Experimental group consisted of children that were attending a Montessori Pre-school. A non-Montessori pre-school in the same community served as the Control Group. At the beginning of the school year all children at both schools were tested, using the Peabody Picture Vocabulary Test (Form A). After this preliminary testing, socio-economic and family information was gathered on all children. With this information the 25 subjects were matched on a one-to-one basis using the I.Q. and the socio-economic family information that was available (See form 1-A in Appendix).

Figure I on the following page illustrates the matching variables that were used to assign children to the Experimental or Control groups. Results of matching are discussed later in this chapter.

After a period of two months, during which time the teachers of both groups became better acquainted with their children, the Pre-school Outcomes Rating Scale (see Appendix) was distributed and explained to all the teachers. Each teacher was asked to rate all the children in her class. This procedure was used to prevent identification of the children selected as subjects for the study and thus prevent any prejudicial ratings.

During the period that followed a research assistant, trained in observation and interview techniques, visited every home of the Control and Experimental children. During this visit information on parental attitudes, background and home environment was collected. Forms used were: Form 3: Home Evaluation Criteria Scale, Form 6: Parental Attitude Scale and Questionnaire, Form 7: Parental Background Scale (see Appendix)


FACTORS RELATIVE TO THE CHILD
SEX
AGE
ORDINAL position
HEALTH
I. Q.
DISPOSITION
ABILITY TO LEARN
EDUCATION MOTHER and FATHER
mother
father
FATHER'S -Age -Occupation -Activity
SOCIO ECONOMIC LEVEL of FAMILY
MOTHER'S -Age -Occupation -Activity
FACTORS RELATIVE TO THE HOME AND PARENTS
SIBLINGS others in the home
family
home

MATCHING VARIABLES— in
SELECTING CHILDREN FOR THE CONTROL AND
EXPERIMENTAL GROUPS-Phase I

Towards the end of the school year some of the children in both groups reached the age of five. To the five-year-olds the investigators administered the Minnesota Pre-School Scale and the S.R.A. Mental Ability Tests. The data thus secured provides a basis for a follow-up study, if desired.

Approximately two to three weeks before the end of the school year the Pre-School Outcomes Rating Scale (Form 4) was again administered by the same teachers and by trained adult observers in the classrooms. The Peabody Picture Vocabulary Test (Form B) was also administered. These tests provided the basis for assessing the comparative progress of the two groups under investigation.

Phase I of the study thus consisted of two groups of children attending a Montessori pre-school and a non-Montesorri pre-school in the same community. The following instruments were administered to both groups: Form 1 A: Child Information; Form 3: Home Evaluation Criteria Scale; Form 4: Pre-School Outcomes Rating Scale; Form 6: Parental Attitude Scale and Questionnaire; Form 7: Parental Background Scale.

The tests administered included: Peabody Picture Vocabulary Test: Pretest-Form A, Post-test Form B; Minnesota Pre-School Scale and S.R.A. Mental Abilities Test.

B. Design of Study, Phase II

Phase II of this study was primarily exploratory. The authors saught to determine what differences if any existed between children who had pre-school training (Montessori and other-than-Montessori) and those who had no pre-school training.

The authors would like to emphasise that any differences found in Phase II could not be attributed to pre-school training with any degree of certainty, but if differences were found to exist at a significant level, a more refined investigation could be initiated to determine the cause of such difference.

The exploratory phase (Phase II) of this investigation was composed of three basic groups of children:

Group 1 consisted of Montessori trained children that had one, two or three years of Montessori training and were now in the public or private schools of the community.

Group 2 consisted of two groups of public school children that: 1. Had one, two or three years of pre-school experience-training (non-Montessori) and 2. Had no pre-school experience.

Group 3 consisted of two groups of private school children that: 1. Had one, two or three years of pre-school experience-training (non-Montessori) and 2. Had no pre-school experience.

These three groups were then evaluated on the Outcomes Rating Scale. The scores of standardized test (given by the schools in which the children were enrolled) and teacher ratings of various traits were assessed. The rating scale and standardized tests are discussed below. Besides the items mentioned above the teachers rated the children on: 1. The child's relationship with peers. 2. The child's interest in learning, and 3. Creativity demonstrated by the child. The teacher also made a general estimate of the child's emotional stability and his physical condition.

Another aim of Phase II was to determine the nature and extent of ease of adjustment in first Grade, or contrarily, the extent and nature of adjustment difficulties (see Form 5 Appendix) of Montessori trained children. Only Group I was included in this investigation since the assention has been made that "Montessori trained children will have difficulty in adjusting to the regular school environment," presumably because of their having become accustomed to individualized learning activities.

The adjustment investigation was carried out using: Form 2: General Evaluation of Child and His Adjustment to School; Form 5: Structured Interview with Teachers and; Form 4:Outcomes Rating Scale. The major portion of this investigation was completed within two months of the child's entrance into either Kindergarten or First Grade.

The other section on the study consisted of subgroups as illustrated in Figure 2 on the following page.

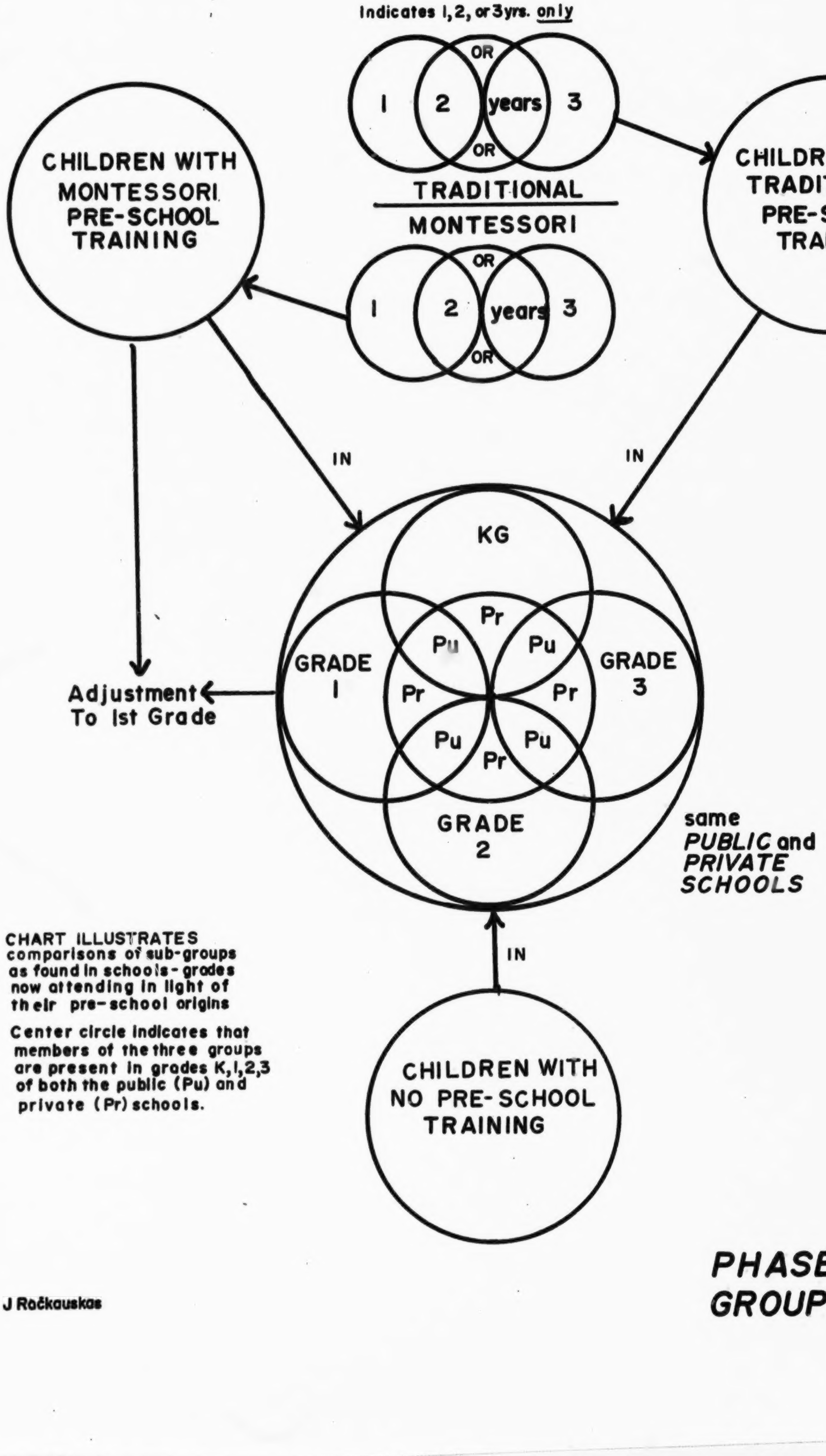

Indicates 1, 2, or 3 yrs. only
1
OR
2
years
3
OR
TRADITIONAL
MONTESSORI
1
OR
2
years
3
OR
CHILDREN WITH MONTESSORI PRE-SCHOOL TRAINING
CHILDREN WITH TRADITIONAL PRE-SCHOOL TRAINING
IN
IN
KG
Pr
Pu
Pu
GRADE 1
Pr
Pr
GRADE 3
Pu
Pu
Pr
GRADE 2
Adjustment To 1st Grade
same PUBLIC and PRIVATE SCHOOLS
IN
CHILDREN WITH NO PRE-SCHOOL TRAINING

CHART ILLUSTRATES comparisons of sub-groups as found in schools-grades now attending in light of their pre-school origins

Center circle indicates that members of the three groups are present in grades K, 1, 2, 3 of both the public (Pu) and private (Pr) schools.

PHASE – 2 GROUPS

J Račkauskas

2°

The following sub-groups, as illustrated in the preceeding page, are then derived from the tree main groups:

GROUP ONE

M-1 PR-1 M-1 PR-2 M-1 PR-3	Montessori Trained (M) for one year(-1) now in private (PR) schools attending grades one (1), two(2) or three(3)
M-2 PR-1 M-2 PR-2 M-2 PR-3	Montessori trained for 2 years now in private schools attending grades one, two, or three.
M-3 PR-1 M-3 PR-2 M-3 PR-3	Montessori trained for 3 years now in private schools attending grades one, two, or three.

M-1 PU-1	M-2 PU-1	M-3 PU-1	These nine groups follow the same order as those above except that these children attend Public (PU) schools vs. Private
M-1 PU-2	M-2 PU-2	M-3 PU-2	
M-1 PU-3	M-2 PU-3	M-3 PU-3	

GROUPS TWO AND THREE (PART)

NP PU-1 NP PU-2 NP PU-3	Children with no-pre-school (NP) now attending public school grades one, two or three.
NP PR-1 NP PR-2 NP PR-3	Children with no-pre-school (NP) now attending private school grades one, two or three.

GROUPS TWO AND THREE (PART)

PRE PR-1	PRE-2 PR-1	PRE-3 PR-1	Children had Pre-school (PRE) now in private school grades 1,2, or 3
PRE PR-2	PRE-2 PR-2	PRE-3 PR-2	
PRE PR-3	PRE-2 PR-3	PRE-3 PR-3	

PRE-1 PU-1	PRE-2 PU-1	PRE-3 PU-1	Children had Pre-school now in public school (PU) grades 1, 2, or 3
PRE-1 PU-2	PRE-2 PU-2	PRE-3 PU-2	
PRE-1 PU-3	PRE-2 PU-3	PRE-3 PU-3	

C. Instruments and Tests Used:

Form 4 - Pre-School Outcomes Rating Scale. The project developed a series of evaluative rating scales. The major rating scale is Form 4: Pre-School Outcomes Rating Scale (see Appendix). This scale was developed during the first year of the project, but underwent many changes and revisions before it was decided to use the form reported here. Basically this scale consists of three parts:

1. Explanation - Directions for use
2. Definitions of Terms - Uniform Standard of Reference (Parts 1 and 2 appear as form 4 A in Appendix A)
3. Rating Scale (Form 4 in Appendix A)

The Pre-School Outcomes Rating Scale is a bipolar rating instrument which has eight sections. Each section represents a major trait within which are a set of stimulus variables. These eight sections are:

I. Attitude
II. Behavioral Characteristics
III. Work Habits
IV. Motor Coordination
V. Sensory Acuity
VI. Language Skills
VII. Mathematics
VIII. Creativity - Imagination

A total of 27 stimulus variables are in the scale under these eight sections. To allow a rater to express his confidence in the ratings given on the scale a confidence rating is included at the end of the 27 items. The stimulus variables are divided into a scale interval ranging from minus three (-3) through a neutral point (0) to plus three (+3).

Every item on the scale is given a uniform standard of reference (part two of Form 4-A in Appendix A).

In Appendix B a Reliability of Outcomes Table identifies the stability coefficients and the coefficients of observer agreement for each section of the scale as well as the levels of significance of these coefficients.

Form 3 - Home Evaluation Criteria Scale (see Appendix A) This scale was designed to be used with parents of the children in both the experimental and control groups. The scale consists of six sections:

1. Attitudes and Habits (of the child)
   Six sub-sections and 27 items.
2. Sensory acuity and perception
   Two sub-sections and 10 items.
3. Intelligence
   Two sub-sections and 20 items
4. Socialization
   Five items
5. Creativity
   Five items
6. Motor Coordination
   Five items

The scale consists of 72 items. Each item has five scale intervals, ranging from "no-never" to "always". In order to increase reliability both father and mother were interviewed separately.

Form 5 - Outline of Structured Interview With Teachers. Interviews were used in conjunction with rating scales in the adjustment section of Phase II of the project. In order to overcome some of the problems inherent in the interview technique the experimentors used only one interviewer and designed a structured interview form.

Form 5 - Outline of Structured Interview with Teachers, (See Appendix) gave the experimentors more insight into the attitudes of the teachers and the nature on adjustment difficulties. The interview form consists of three basic areas: 1. Reeording of any specific difficulties the child evidenced upon his entrance into first grade; 2. Any positive qualities which the child demonstrated; 3. Any negative qualities that the child demonstrated in relation to the other children in the classroom.

The teacher's attitude towards Montessori and her knowledge of Montessori programs was also noted. In addition the teacher was asked to give her estimate of where the child stood in relation to three areas: number activities, reading activities and writing activities. Test data on the child, where available, was also recorded.

Form 1 -A - Child Information (see Appendix A). Consists of 10 questions about the child and a set of questions about the parents.

Form 2 - General Evaluation of Child and His Adjustment to School (see Appendix A) secured information needed in Phase II of the project. General control information about the child's enotional stability, physical condition, social adjustment, interest in learning and creativity are included.

Form 6 - Inventory of Family Life and Children (see Appendix A) consists of 60 attitude statements revealing various aspects of the parent-child relationship and of the kind of home atmosphere surrounding the child. Four degrees of agreement - disagreement response enabled the parent voluntarily to reveal the family situation. The form used in this study was the result of four earlier revisions.

Form 6 as well as Form 7 were designed to learn more about the emotional atmosphere of the home and to find out the entent to which the outcomes of the preschool program were noticeable in carry over into the home and the children by their parents.

Form 7 - Socio-Economic and Educational Background (see Appendix A) consisted of 25 factors which the interviewer noted on a five degree response scale.

Tests Used: Tests A,B, and C below were administered during the investigative period and used in Phase I. Results of Tests D,E,F, and G were taken from school records for use in Phase II. Scores from Tests D and E, in order to be comparable were converted by means of equivalence tables prepared by the Bureau of Pupil Guidance, Chicago Public Schools.[9]

Tests used included: A.) The *Peabody Picture Vocabulary Test*, B.) Katharine M. *Banham's Maturity Level for School Entrance and Reading Readiness*. C.) *The Minnesota Pre-School Scale* and the *SRA Primary Mental Abilities* (Ages 5-7).

Test scores from the following standardized tests were taken from cumulative school records for use in Phase II.

D. *Otis Quick Scoring Mental Ability Test*
Alpha 1-4 by Arthur S. Otis.
Harcourt, Brace and World, 1954

E. *California Short-Form Test of Mental Maturity*
By Elizabeth Sullivan, Willis Clark and Enest
W. Tiegs, California Test Bureau, 1963

F. *Stanford Achievement Test* - Primary I and II
Battery by Truman Kelly, *et.al.*,
Harcourt, Brace and World, 1964

G. *SRA Tests of General Ability (Grades K-2)*
Science Research Associates, 1959

Other tests which were tried for their suitability but were not used: *Vineland Social Maturity Scale, Verbal Language Development Scale, Columbia Mental Maturity Scale and Developmental Test of Visual Perception*.

D. Selection of Subjects - Phase I

The subjects for the study were chosen from the general enrollment of a Montessori pre-school and a near-by cooperating pre-school in the same community.

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[9] Kenneth W. Lund, Mary Nee and Max D. Englehart, *Equivalence of Intelligence Quotients of Five Group Intelligence Tests* (Chicago, Illinois: Board of Education, City of Chicago, Bureau of Pupil Guidance, (no date).

At the beginning of the school year the Peabody Picture Vocabulary Test (Form A) was administered to the general population of both schools. After this, I.Q. date was secured, and family background information was gathered for both sets of children (Form 1-A).

The children were matched on the basis of these two sets of data. The first matching variable was the I.Q. score as represented on Form A of the PPVT. Next, children with comparable I.Q.'s were further matched by using the information available on Form 1-A.

These other matching variables were:

1. Sex
2. Age - years, months
3. Ordinal position of child in family
4. Number of siblings in family
5. Socio-economic level of family
6. Health of the child
7. Disposition of child
8. Ability to learn and grasp new ideas
9. Father's age
10. Father's education
    a. Occupation
    b. Community activities-involvement
11. Mother's age
12. Mother's education
    a. Occupation
    b. Community activities - involvement

Results of this matching provided 25 experimental and 25 control subjects. Because of factors such as moving from the community, withdrawl from school, and others, the Experimental and Control groups were stabilized with 21 subjects each, for a total of 42 subjects.

The subjects were chosen from several different class rooms, thus no single teacher had more than 25 to 35 percent of the children in either of the two groups. Following page gives a summary of the matching for both groups. (See Appendix B for a detailed breakdown as to how the Experimental and Control groups compared on the matching variables).

SUMMARY — PHASE I SELECTION OF SUBJECTS

VARIABLES MATCHING	CONTROL GROUP	EXPERIMENTAL GROUP
TOTAL NUMBER OF SUBJECTS	21	21
SEX		
MALE	12	13
FEMALE	9	8
AGE (M)	4.41	4.38
ORDINAL POSITION	1.66	1.62
MALE	1.66	1.62
FEMALE	1.66	1.63
SIBLINGS	1.48	1.76
SOCIO-ECONOMIC LEVEL	3.76	3.66
HEALTH OF CHILD	2.52	2.33
DISPOSITION	2.52	2.33
ABILITY TO LEARN	2.48	2.57
AGE OF PARENTS		
FATHER	34.05	35.00
MOTHER	31.57	32.33
EDUCATION — YEARS		
FATHER	16.62	17.38
MOTHER	14.76	15.70
FATHERS OCCUPATION		
WARNER'S SCALE	1.57	1.47
HATT— NORTH	82.71	83.28
MOTHERS OCCUPATION[1]	N.R	N.R.
INTELLIGENCE (as measured by the PPVT)		
MEAN I.Q.	107.523	107.285
STANDARD DEVIATION	12.46	13.27

---

[1] NOT REPORTED — PRESENTLY HOUSEWIVES

I.Q. Data: I.Q. was one of the main matching variables. I.Q. scores on the Peabody Picture Vocabulary test (Form A) resulted in the following mean I.Q. scores for the groups:

Experimental Group	107.29
Control Group	107.52

The range of the I.Q. Scores was 78 to 129 for the Experimental and 80 to 132 for the Control group. The figure on the following page shows the distribution of I.Q. scores for the two groups.

E. Selection of Subjects - Phase II

Phase II of the study had subjects from 3 main sources.

1. All previous Montessori trained children in the community.
2. Public school children grades K, 1,2, and 3.
3. Private school children grades K, 1,2, and 3.

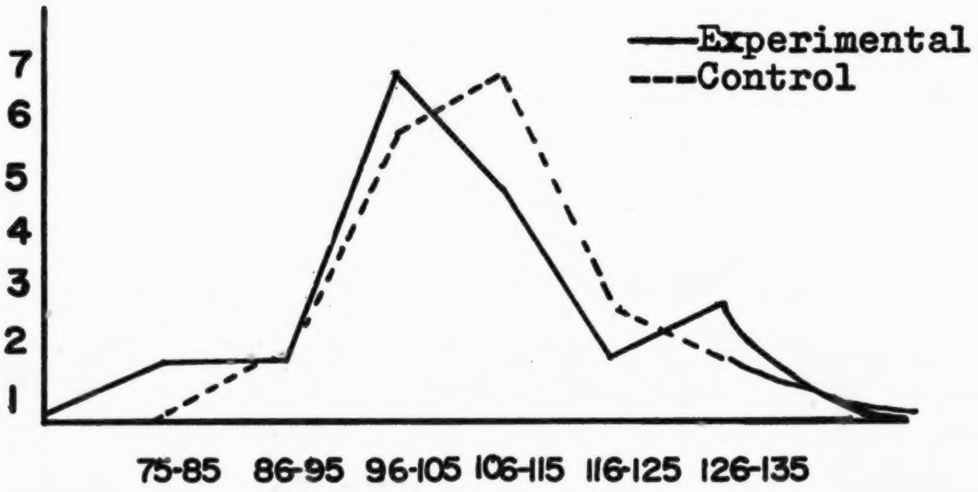
From these sources subjects were selected as follows:

a. Montessori Children

From the master list of children that had attended the Montessori pre-school and were now in the public and private schools in the community 50 children were picked at random. Of these 45 were still in the community and thus included in the group. Of the 45 children six were in kindergarten, 19 were in first grade, 19 were in second grade and one was in third grade. There were 19 females and 26 males. In terms of present enrollment 35 were in private schools and 10 were in public schools. Actual distribution of school years in the Montessori pre-school was 17 children with one year, 23 children with two years and 5 children with three years. The children were now in 20 private elementary schools and eight public elementary schools.

DISTRIBUTION OF I.Q. SCORES FOR CONTROL AND EXPERIMENTAL SUBJECTS

PHASE-I



Standard Deviation for I.Q. Scores of the Experimental group was 13.27. Standard Deviation for I.Q. Scores of the Control group was 12.46

b. Public School Children

From the public schools in the community three schools were selected to represent a good cross-section of the community. Each of the selected schools had Montessori trained children in attendance. From general class lists, furnished by the Principals for grades kindergarten, first, second, and third a total of three children from each class were selected at random. It was felt that giving a teacher more than three children to rate might prove burdensome and thus reduce the degree of her reliable cooperation. A total of 25 teachers-classrooms were involved in the three schools. Seventy five children were selected and packets of instructions, scales and pre-paid envelopes were left with the teachers. A total of 35 packets were returned, since anonymity was assured teachers (teachers were asked not to sign their names), no follow-up was possible to increase the level of response.

In terms of actual classroom response information was available to two kindergarten children, 13 first grade children, 15 second grade children and five third grade children. There were 20 males and 15 females. Surprisingly only 15 of the 35 had no pre-school experience while 16 had one year and four had two years. None of the children had three years of pre-school experience.

c. Private School Children

The same procedure was followed as for the public school children. The private school group had 44 children, of which six were in kindergarten, 18 were in first grade, 16 were in second grade. Four children were male and 26 were female. Number of years of pre-school the children had was: 22 no pre-school, 19 one-year of pre-school and three two years of pre-school experience. None had three years of pre-school experience.

The table on the following page gives the summary-composition of the three groups in Phase II.

PHASE-2 DISTRIBUTION of SUBJECTS

VARIABLES	MONTESSORI GROUP I	PUBLIC GROUP 2	PRIVATE GROUP 3	TOTAL 2&3 GROUPS 2+3 ONLY	SUMMARY ALL GROUPS
TOTAL Subjects	45	35	44	79	124
KINDERGARTEN	6	2	6	8	14
FIRST GRADE	19	13	18	31	50
SECOND GRADE	19	15	16	31	50
THIRD GRADE	1	5	4	9	10
SEX					
MALE	26	20	18	38	64
FEMALE	19	15	26	41	60
SCHOOLS					
PUBLIC	10	35	-	35	45
PRIVATE	35	—	44	44	79
YEARS OF PRESCHOOL					
ONE YR.	17	16	19	35	52
TWO YRS.	23	4	3	7	30
THREE YRS.	5	0	0	0	5
NO PreSchool	—	15	22	37	37

Chapter 3

RESULTS

CHAPTER 3 - DATA ANALYSIS, DISCUSSION AND RESULTS

An inspection of extensive charts of comparative raw data for the Montessori and Control groups, on the surface, would seem to favor quite definitely the Montessori-trained children. They seem to have made greater gains in intelligence growth, as measured by the Peabody Picture Vocabulary Test, and to have given more evidence of greater trait acquisition as judged by their teachers, except in the area of creativity where both groups seem to have made equal progress. Traits which the Experimental Montessori group seem to have acquired with greater definity, to the extent of being more noticeable by evaluations are: initiative, self-confidence, self-control, persistence, independence, acuity in sensory perception, concentration, positive attitude toward learning and purposefulness of activity.

What basic factors, if any, are operating in the mass of raw data we have involving this total set of variables?

A. Phase I : Data Analysis and Results

1. Factor Analysis

Thus, in order to locate basic factors operating in all the variables, the authors factor analyzed the teachers' ratings.

Since four groups of subjects were involved, with possible different factor patterns in each, a procedure devised by Tucker[10] was used, which results in: 1)a factor pattern which is a least-squares fit to all four groups, 2) estimates of the factor variances for each group. The latter two results are used to assess differences in the factor pattern among the four groups.

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[10] Procedure described in a personal communication from L.R. Tucker to M. Black, 1962.

TABLE 3

VARIABLES IN DATA ANALYSIS

1. Positive and Happy
2. Cooperative, interested in learning
3. Self-control, responsive to discipline
4. Ability to attend, follow directions
5. Independence, confidence in self
6. Relations with teachers and other children
7. Initiative, use of time
8. Handling of materials with purpose
9. Persistence, complete cycle of work
10. Eye-hand coordination
11. Use of pencil, scissors (fine muscle activity)
12. Practical life materials
13. Large muscle activity (running, throwing)
14. Interest in sensory materials-tasks
15. Progress in distinguishing differences
16. Clarity of perceptions
17. Intelligible articulation
18. Self-expression in simple sentences
19. Vocabulary (word growth)
20. Grasp of verbal symbols
21. Interested in math materials--tasks
22. Growth in number concepts
23. Counting ability
24. Creative use of materials
25. Peabody I.Q.

A covariance matrix among all variables was generated for each of the four groups: Montessori children, 1964 testing (M64); Montessori children, 1965 testing (M65); Control pre-school children, 1964 testing (C64); and Control pre-school children, 1965 testing (C65). A mean covariance matrix was obtained by summing the four group matrices and dividing the summed matrix by 4.0. All five covariance matrices were then scaled, since the mean variance of all variables, averaged across all four groups, was 1.00; that is, the mean matrix was standardized, and the group matrices standardized against the mean matrix.

This mean matrix was factored by the principal axis method[11]. The resultant principal axis factor pattern was a least-squares best-fit to the four group covariance matrices[12].

TABLE 4

FACTOR EIGENVALUES

Factor	Eigenvalue	Percent Estimated Communality	Cumulative Percent
1	12.63	66.13	66.13
2	2.24	11.72	77.85
3	1.36	7.10	84.95
4	.81	4.24	89.19
5	.75	3.91	93.10
6	.50	2.61	95.71
7	.46	2.41	98.12
8	.36	1.91	100.03

---

[11] H.H. Harman, Modern Factor Analysis (Chicago: The University of Chicago Press, 1960), Chapter 9.

[12] Jos Levin, "Simultaneous Factor Analysis of Several Gramian Matrices," Psychometrika,Vol. 3,1966, pp. 413-19.

Squared multiple correlations, adjusted for use with covariance matrices, were used as communality estimates, and were inserted into the diagonal cells of the mean covariance matrix prior to factoring.[13] Factors were extracted until 100 percent of the estimated communality was accounted for. This resulted in the extraction of eight factors. For rotation, all factors accounting for at least five percent of the estimated communality and having eigenvalues of at least 1.00 were retained. The first three principal axis factors qualified for retention under these criteria. The three principal axis factors were rotated to the binormamin criterion of oblique simple structure.[14] The primary factor pattern is presented in Table 5.

Factor 1 - Positive Attitude Toward Learning. The dominant element among the high loading variables in this factor appears to be an inner disposition or pattern of inner reactions conducive to learning. This factor seems to have much to do with the child's general approach to learning tasks and the learning environment and little to do with any specific content area of work. Consequently, the authors identified this factor as representing a positive attitude toward learning -- an inner residual effect resulting from influences to which the child has been exposed.

Factor 2 - Sensory-Motor Coordination. The nature of this factor is somewhat confusing. The four highest loading variables are all, quite obviously, physical activity variables. The next three highest loading variables, just as obviously, are mathematical ability variables. Since it can be assumed that sensori-motor coordination or physical dexterity and mathematical ability are not the same phenomenon, a question is raised as to how the two became confounded in this study. The answer would seem to lie

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[13] Harman, op.cit., pp. 89-91

[14] Ibid., p. 326.

TABLE 5

PRIMARY FACTOR PATTERN

Variable	Factor		
8. Handling of materials with purpose	.90	(+.27)	(-.30)
9. Persistence,completes cycle of work	.89	(+.30)	(-.25)
4. Ability to attend,follow directions	.81	(+.11)	(-.05)
3. Self-control, responsive to discplin	.79	(-.07)	(+.04)
7. Initiative, use of time	.78	(+.16)	(-.04)
2. Cooperative, inter sted in learning	.72	(-.14)	(+.28)
6. Relations with children & teachrs.	.68	(-.12)	(+.24)
5. Independence,confidence in self	.51	(+.22)	(+.18)
12.Practical life materials	(-.04)	.75	(+.03)
11.Use of pencils, scissors	(+.16)	.74	(+.16)
10.Eye-hand coordination	(+.42)	.56	(+.02)
13.Large muscle activity	(-.11)	.55	(+.40)
22.Growth in number concepts	(+.17)	.52	(+.35)
21.Interested in math materials-tasks	(+.36)	.51	(+.10)
23.Counting ability	(+.05)	.50	(+.40)
15.Progress in distngshg. diffrncs.	(+.36)	.50	(+.26)
18.Self-expression - simple sentences	(-.21)	(+.16)	.88
17.Intelligible articulation	(-.12)	(+.29)	.75
19.Vocabulary (word growth)	(+.01)	(+.20)	.71
20.Grasp of verbal symbols	(-.18)	(+.36)	.69
25.Peabody I.Q.	(+.02)	(-.15)	.57
1.Positive and Happy	(+.43)	(-.31)	.53

Note: Only loading of .50 or higher were considered in identifying the factors. Loadings of less than .50 are shown in parentheses, for reference only.

in the fact that, in Montessori programs, the mathematical materials involve considerable physical manipulation along with the noting of differences in size, amount, length, shape and number, such as in working with the number rods, the mathematical beads, the geometric solids, the board stairs and the sandpaper numbers. In other words, mathematical ability was measured through the medium of the physical handling of quantitative materials. The sensori-motor coordination variable is, however, the higher loading of the two, indicating that this factor at least in the young child of three to six, is primarily one in which physical dexterity plays a significant role.

Factor 3 - Verbal Ability. The high loading variables of this factor are all verbal activity variables, thus designating Factor 3 as Verbal Ability.

As can be seen in Table 5, the simple structure of the pattern is quite good. All of the salient variables have loadings of .50 or higher on only one factor.

The correlations among the factors are shown in Table 6. The highest correlation (.58) is between Positive Learning Attitude and Verbal Ability. That Positive Learning Attitude should correlate positively with Verbal Ability, which is usually required in classroom activities, is not surprising. It indicates that the children who have developed the best attitudes toward school and learning generally do the best work. More specifically, the correlation tends to highlight the inter relation of a positive learning attitude in generating high verbal ability and vice versa.

Physical Dexterity or Sensori - Motor Coordination correlates with Verbal Ability .40. It must be noted here that verbal ability, unlike mathematical ability, was not measured through the medium of the physical handling of materials. It may be the contamination of physical dexterity with mathematical ability which is causing its correlation with Verbal Ability. In other words, the correlation may actually be between verbal ability and mathematical ability, which the authors suspect, rather than between verbal ability and physical dexterity. That, of course, would be expected from the influence of general intelligence on both verbal and mathematical ability. Likewise, the correlation of .34 betwsen Positive Learning Attitude and Sensori - Motor Coordination, or Physical Dexterity, may actually be a carrelation between the former and mathematical ability, which, as noted, would be expected.

TABLE 6

PRIMARY FACTOR CORRELATIONS

Factor	Factor		
	1	2	3
1	1.00	.34	.58
2		1.00	.40
3			1.00

It occured to the authors that the contamination of sensori-motor performance or physical dexterity with mathematical ability might be resolved by rotation of four, rather than three, principal axis factors, in the hopes that the Sensori - Motor Coordination or Physical Dexterity factor would split into two separate, but correlated, factors. Accordingly, four principal axis factors were rotated to the binormamin criterion.

The following are the results of the authors' rotating for the possibility of four factors. Factor 1, Positive Learning Attitude, remained. Sensori - Motor Coordination or Physical Dexterity did emerge as a separate, uncontaminated, factor. However, Verbal Ability splits apart, forming a mixed Mathematical Ability - Verbal Ability Factor, and a fourth, largely uninterpretable factor, which appeared to be a mixture of verbal ability and personal adjustment. The simple structure was not as clear as in the case of the three-factor solution. In addition, the four-factor solution involved the retention of a factor with an eigenvalue of less than 1.00, a procedure which is not, as a general rule, mathematically defensible. The attempted four-factor solution thus confirmed the authors' initial decision to use a three-factor solution. The contamination of Sensori - Motor Coordination or Physical Dexterity with Mathematical Ability is apparently an inherent function of the data, and not the result of underextraction.

Table 7 presents the variances of every factor for each of the four groups of children in the study.

TABLE 7

GROUP FACTOR VARIANCES

Group	Factor		
	1*	2**	3***
Experimental - Montessori,1964	1.16	1.18	1.25
Control-Non-Montessori,1964	.67	.91	.41
Montessori - Experimental,1965	1.02	1.24	1.47
Non-Montessori - Control, 1965	1.08	.48	.71
Mean	.98	.95	.96

* Learning Attitude
** Sensori-Motor Mathematics
*** Verbal Ability.

The Lawley-Maxwell test for the equivalance of covariance matrices indicated that the overall differences in the variances were significant at p. 025.

Considering each factor individually, however, no exact test of the variance differences among groups exists.

In applying Hartley's test[15] as an approximate test, the group variances of Factors one and two were not significantly different at p. 05. The group variances of Factor three, however, were significantly different at p. 05.

More specifically, the mean variance of both Montessori groups was significantly higher (at p. 05) than the mean variance of both Control groups. This indicates that the Verbal Ability factor is a stronger, or more important, factor among the Montessori groups than among the Control groups. Within any one group, there are no significant differences among the variances of the three factors; that is, within groups, the three factors can all be considered of equal importance.

Table eight presents the correlations among factors for each group.

TABLE 8

GROUP FACTORS CORRELATIONS

Group	Factor Pair 1-2*	 1-3**	 2-3***
Montesorri 1964	.63	.59	.42
Control 1964	.18	.50	.37
Montessori 1965	.55	.63	.86
Control 1965	-.10	.65	-.42
Mean	.37	.60	.43

*Positive learning attitude and sensori-motor-mathematics.
** Positive learning attitude and verbal ability.
*** Sensori-motor-mathematical and verbal ability.

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[15] Helen Walker and Jos Leo, Statistical Inference (New York: John Wiley and Sons, (962), pp. 192-5.

The correlation between Positive Learning Attitude and Sensori-Motor Coordination is very low (.15) for both Control groups, but moderate (.59) for both Montessori groups. This difference between the Montessori and Control groups is significant at p. 05, according to Fischer's z test.[16]

The authors stated above that the overall correlation of .34 between the two factors of Positive Learning Attitude and Sensori-Motor Coordination might actually represent a correlation of the former with mathematical ability, rather than with true physical dexterity. That presumption seems to be borne out by the authors' data. It is only in the Montessori classrooms that mathematical ability is measured through physical, manipulative activity, most of which involves the handling of mathematical rods, beads, solids, etc.

In the Control classrooms, Physical Dexterity would be uncontaminated with Mathematical Ability. The correlation between Positive Learning Attitude and Physical Dexterity is seen to be almost entirely a function of the Montessori groups, where it is contaminated or involved with mathematical ability. Among the Montessori groups alone, the correlation between the two factors is about as high as that between Positive Learning Attitude and Verbal Ability. Among the Control groups, where Physical Dexterity is not contaminated with Mathematical Ability, the correlation between the two factors is not statistically significant at p. 05.

The correlation between Positive Learning Attitude and Verbal Ability is positive and constant for all four groups.

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[16] Quinn McNemar, Psychological Statistics (New York: John Wiley and Sons, 1962), pp. 139-140.

The group factor correlations between Physical Dexterity - Mathematics and Verbal Ability are more difficult to interpret. According to Fischer's z test, the increasing positive relationship from .42 to .86 (see Table 8) between M64 to M65 is not significant at p. 05, but the shift from .37 to -.42 between C64 and C65 is significant at p. 02. Whereas, Physical Dexterity - Mathematics is moderately related to Verbal Ability in a positive direction for the C64 group, it reverses to a negative relationship of about the same magnitude for the C65 group. No conclusion can be drawn from these data concerning the Physical Dexterity - Verbal Ability relationship.

b. Discriminant Analysis

The three factors derived from the original 25 variables were used as input for the discriminant analysis. Scores on each of the three factors were estimated for each subject by the general-inverse methos.[17] For each type of school, the 1965 score matrix was subtracted from the 1964 change matrix, resulting in a matrix of change scores on each factor for each of the two groups (Montessori and Control). The change score matrixes were subjected to discriminant analysis in order to derive new variates whose change scores would be maximally different for the two groups.[18]

TABLE 9

DISCRIMINANT EIGENVALUES

Discriminant	Eigenvalue	Eta	Eta Squared	Percent Variance	Cumulative Percent
1	1.44	.77	.59	100.00	100.00
2	.00	.00	.00	.00	100.00
3	.00	.00	.00	.00	100.00

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[17] Paul Horst, Matrix Algebra for Social Scientists (New York: Holt and Company, 1963), pp. 405 -6.

[18] W.W. Cooley and P.R. Lohnes, Multivariate Procedures for the Behavioral Sciences (New York: John Wiley and Sons, 1962), pp. 116-121.

As can be seen in Table 9, one discriminant accounted for all of the input variance. This was, of course, necessary, since the number of significant discriminants can not exceed one less than the number of groups. The Wilk's Lambda criterion[19] indicated that the discriminant is significant at p.001. The discriminant is obviously non-trivial, having an Eta Squared of .59. Thus, 59 percent of the total variance among factor change scores is attributable to differences between the Montessori and Control group means. Corrected for bias,[20] the estimated population value of Eta Squared is .42.

Three eigenfactors were extracted in order to obtain a matrix of discriminant coefficients whose rank would be equal to the number of input factors. The discriminant coefficient matrix was inverted, by the general inverse procedure.[21] The resultant inverse was the discriminant pattern. The discriminant pattern is analogous to, and is interpreted similarly to, a factor pattern. Its elements are the coefficients for estimating the input factors from the derived discriminants, just as, in a factor pattern, the elements are the coefficients for estimating the input variables from the derived factors. All but the first discriminant were discarded, in both the discriminant coefficient matrix and the discriminant pattern matrix, since only the first discriminant was significant.

The discriminant repression coefficients are presented in Table 10, and the discriminant pattern in Table 11.

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[19] W.W. Cooley and P.R. Lohnes, *Multivariate Procedures for the Behavioral Sciences* (New York: John Wiley and Sons, 1962) p. 118.

[20] J.P. Guilford, *Fundamental Statistics in Psychology and Education* (New York: McGraw-Hill, 1965), p.401.

[21] Horst, *Loc. cit*.

TABLE 10

DISCRIMINANT REGRESSION COEFFICIENTS

Factor	Deviation Coefficients	Standard Coefficients
1	.31	.28
2	.18	.16
3	.72	.85

Note: Deviation coefficients are those applicable to deviation factor change scores; Standard coefficients are those applicable to standard factor scores. In both cases, the total sample (all groups augmented) is the reference point for adjusting factor change scores.

TABLE 11

DISCRIMINANT PATTERN

Factor	Deviation Loadings	Standard Loadings
1	.44	.49
2	.37	.41
3	1.11	.94

Note: Deviation loadings are those which reproduce deviation factor change scores; standard loadings are those which reproduce standard factor change scores. In both cases, the total sample (all groups augmented) is the reference point for the adjusted factor change scores.

Inspection of the Standard Loadings in Table 11 indicates that the discriminant is almost entirely defined by the Verbal Ability Factor, the other two factors having loadings below .50. The discriminant is clearly a verbal ability dimension and is virtually identical with the input Verbal Ability factor. A comparison of Tables 11 and 6 indicate that the Positive Learning Attitude and Physical Dexterity factors are related to the discriminant to about the same extent as they are related to the input Verbal Ability factor.

Mean discriminant scores for each of the four original groups were estimated, and are presented in Table 12.

Inspection of the Standard Score means in this table indicates that the Montessori group improved its mean score from -.48 to 1.17, from 1964 to 1965, which is an increase of 1.65 S.D. The Control group also improved its mean score, but by a lesser amount. Its change from -.64 to -.06 is an increase of only .58S.D., The net difference in change is 1.08 S.D., that is the Montessori group improved its mean score on the discriminant by 1.08 S.D. more than did the Control group.

The total variance of the discriminant was analyzed into components in several different ways. These components are shown in Table 13. First the total variance for all groups was analyzed into its within-years and between-years components, with total variance scaled to 1.00. The between-years component of nearly one-third indicates that the total amount of change is not only statistically significant but of practical importance as well. Considering the Montessori group only, the between-years component is nearly one-half, while for the Control group only, the between-years component is only about one-fifth. The net difference in between-years component is .27; that is, the Montessori group showed 27 percent more between-years variance than did the Control group.

TABLE 12

DISCRIMINANT MEANS, VARIANCES, AND STANDARD DEVIATIONS

	RAW SCORES		
Group	Mean	Variance	Standard Deviation
Montessori 1964	-.77	1.66	1.29
Montessori 1965	1.89	1.99	1.41
Control 1964	-1.03	.67	.82
Control 1965	-.10	.88	.94
Pooled within groups	.00	1.30	1.14
Total	.00	2.61	1.62

	STANDARD SCORES		
Group	Mean	Variance	Standard Deviation
Montessori 1964	-.48	.63	.79
Montessori 1965	1.17	.76	.87
Control 1964	-.64	.26	.51
Control 1964	-.06	.33	.57
Pooled within groups	.00	.50	.71
Total	.00	1.00	1.00

TABLE 13

DISCRIMINANT VARIANCE COMPONENTS

Source	Variance
A. All Groups	
Between years (1964-1965)	.31
Within years	.69
Total	1.00
B. Montessori only	
Between years	.49
Within years	.51
Total	1,00
C. Control only	
Between years	.22
Within years	.78
Total	1.00
D. 1964 only	
Between groups	.01
Within groups	.99
Total	1.00
E. 1965 only	
Between groups	.41
Within groups	.59
Total	1.00

Considering both 1964 groups only, it is seen that there is virtually no between-groups variance. Analysis of variance confirmed that the difference between group means for 1964 is not significant at p. 05; that is, there was no initial difference between the two groups with respect to the discriminant. In other words the authors' statistical analysis shows that the Montessori and Control groups were evenly matched at the beginning of this study.

In 1965, the between-groups variance component is .41. Analysis of variance confirmed that this difference between group means was significant at p.001. These results are, of course, compatible with the means in Table 12. The mean difference between the two 1964 groups is only .16 S.D., whereas the mean difference between the groups in 1965 is 1.23 S.D.

Based on the above analysis of the data, the authors can say that the children with Montessori pre-school experience gained significantly more than the children with non-Montessori (Control groups) pre-school experience in the area of verbal ability. The difference in gains in verbal ability is statistically significant at the .001 level of confidence.

B. PHASE II - EXPLORATORY FINDINGS

Results of Maturity Level for School Entrance and Reading Readiness.

Toward the end of the school year (May) all subjects that were between 5.0 and 5.5 years of age at the time were rated on the check list for determining Maturity Level for School Entrance and Reading Readiness by K.M. Banham. Age limitations provided a limited number of subjects, with ten coming from the Control group and 18 from the experimental Montessori group.

Scores derived from the check list indicated that:

1. The Control group had 50 percent ready to enter first grade.
2. The Control group had 30 percent ready for instruction in reading.
3. The Montessori group had 94 percent ready to enter first grade.
4. The Montessori group had 67 percent ready for instruction in reading.

Comparisons were also made using the matched pairs of children. Five pairs of children were available, within the age limitations. Results on the check list can be summsrized for these groups in the following Table:

TABLE 14

Results of Maturity Level for School Entrance and Reading Readiness for five matched pairs of children ages 5.0 to 5.5 years.

	CONTROL	MONTESSORI	PROBABILITY
Average Age	5.30	5.35	
Average score for School entrance	17	23.2	.01
Average score for Lessons in reading	6	9.2	.01

The results seem to point to a higher maturity and greater readiness level on the part of children who had attended Montessori pre-school.

In further comparing public and private school children of limited pre-school experience with children in the same schools who had Montessori pre-school training, the experimentors found differences in two dimensions.

Teacher ratings indicate that in social interactions with other children, Montessori trained children are able to maintain better interpersonnal relationships than their peers. This is indicated by differences between rating scale scores which are statistically significant as analyzed by the t-test.(See Table 15 below).

Similar statistically significant differences were also found in learning ability and interest in learning, favoring the Montessori - trained child.

Creativity ratings, however, tend to indicate no significant difference between groups. The following table illustrates the findings.

TABLE 15

SOCIABILITY, LEARNING ABILITY AND CREATIVITY
Group Differences for Children in public and private schools with and without Montessori experience.

	Priv	Mont	Prob*	Pub	Mont	Prob	Priv	Pub	Prob
SOCIABILITY	2.14	2.56	.005	2.11	2.56	.05	2.14	2.11	NS
LEARNING	2.30	2.56	.02	2.26	2.56	.025	2.30	2.26	NS
CREATIVITY	2.05	2.24	NS**	2.09	2.24	NS	2.05	2.09	NS

* based on t-test.
**no significant difference.

Adjustment to First Grade

Interviews with teachers of all Montessori trained children in Phase II of the study indicated that no particular difficulties were experienced by these children as a result of their Montessori training. Sociability ratings of these children as reported above, indicated that these children were more sociable, and at a statistically significant level of confidence, than were their peers either with no pre-school training or with other-than-Montessori pre-school training (Control).

The presumed difficulties of adjustment of Montessori children to the demands of a traditional school level environment coming from an atmosphere in which they were accustomed to follow their individual interests and work at their own pace -- were not in evidence, as reported by teachers in both public and private schools, who had these children in first grade.

A predominent consensus of public and private primary grade teachers reported that children with Montessori pre-school experience were "more independent, possessed more leadership and needed a teacher less," than either "pre-school" children or than children who had attended no pre-school other than Montessori.

Carry-over of Pre-School Learning into the Home.

Parents of the 21 Montessori trained children seem to notice a greater carry-over into the home of such out-comes as sensory perception acuity, curiosity to learn and positive learning attitudes, than is reported by the 21 sets of parents whose children were in the

Control group.[22]

These findings are based on structured interviews and as such can only be tentative. For example, 80 percent of the Montessori parents saw evidence of their child's growth in personal independence while 45 percent of the Control group parents reported in this vein.

Parental interview findings were not an integral part of the project and were not submitted to a sophisticated statistical analysis.

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[22] Mary Alice Courtney, "An Exploratory Attempt to Evaluate the Extent to Which Effects of Montessori Pre-School are Noticable in the Home" (unpublished master's thesis graduate school, De Paul University, 1967).

Chapter 4
DISCUSSION

CONCLUSIONS AND RECOMMENDATIONS

Having run the maze of exploratory efforts in attempting to appraise some 28 pre-school outcomes, devising evaluative measures of the outcomes and in applying various statistical procedures to the data, the investigators readily admit to finding more frustrating dead-ends than open avenues leading to clear conclusions.

Certain pre-school learning outcomes are more definitely identifiable than others and consequently are more easily evaluated, e.g., verbal skills such as size of vocabulary and ability to communicate. Findings in these areas are presented with considerable confidence.

Analysis of variance (in which the investigators used both factor as well as discriminant analysis) confirms statistically the superiority of gains in verbal ability made by Montessori - trained children over gains made by a matched group of other than Montessori-trained children. The Montessori group, showed 27 percent more between years change than did the Control group. The difference between the Montessori and Control group means was significant at the p. 001 level of confidence. The difference could be attributed to chance in only one case out of a thousand.

Of the eight factors which emerged from a factor analysis of the total set of variables rated in this study, only three met statistical criteria for retention and further discriminant analysis: positive attitude toward learning, sensory-motor coordination and verbal ability.

Statistical analysis of the data reveals a positive correlation between positive learning attitude and verbal ability thus highlighting the interrelatedness of a positive learning attitude in generating high verbal ability and vice versa.

The positive correlation between positive learning attitude and sensori - motor coordination, puzzling on the surface, and the positive correlation between the latter and verbal ability seemed to be accounted for by the growth in and consequent influence of general intelligence on both verbal and mathematical ability, the latter contaminating the sensori - motor coordination factor in Montessori programs.*

Group variances of the positive learning attitude factor and of the sensori - motor coordination factor were not significantly different at p. .05.

The difference, however, between the Montessori and Control groups is significant at p..05 when the differences in correlations between positive learning attitude and sensori motor coordination were compared: .59 for both Montessori groups and an insignificant .15 for both control groups.

Ninety-four percent of Montessori trained children five to five-and-one-half years old were ready to enter first grade as compared with only 50 percent of this age group in the Control group. The comparable percentages for reading readiness were 67 and 30 percent respectively, thus indicating a higher maturity and greater readiness level produced in the Montessori trained children.

Children in the public and parochial primary grades who had attended Montessori pre-school were found to be superior, at a statistically significant level, to their peers who had attended pre-schools other than Montessori, in inter-personal relations, in learning ability and interest in learning. No significant differences were found, however, between the groups in creativity, both groups having made equal progress.

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*In the Montessori classroom fine muscle sensorimotor activities center on and are inter-twined with especially designed mathematics apparatus such as number rods, bead cubes, geometric solids, etc.

Parochial and public school primary teachers reported no particular adjustment problems "peculiar to Montessori pre-school trained children." The majority rated children who had attended a Montessori pre-school as more independent, less in need of teacher and as evidancing more leadership than their non-Montessori trained peers.

Nearly twice as many "Montessori parents as other than-Montessori pre-school parents noted a definite carry-over and implementation on the part of the child in the home of many of the pre-school intended outcomes. The reporters can not be sure that wishfulfillment is not a possible influencing factor in this difference between Montessori and Control group parents, although parental interviews revealed little if any difference in the two parent groups depth of parental interest and concern with the child's pre-school education.

From the above it is evident that some of the investigators hypotheses are confirmed by findings, others need to be questioned and further researched if not revised.

The following weakness is noted in this study; too many hypotheses were set up for evaluation which required evaluative measures yet to be devised.

While these findings indicate positive values accruing to children with Montessori experience over those with traditional pre-school or no pre-school experience. The authors feel that the measuring instruments used need to be refined in keeping with a further defining of the categories of pre-school outcomes into more specific aspects or facets of behavior: there is need for the designing and constructing a variety of tasks involving initiative, persistence, positive attitude, imagination and the other intended pre-school outcomes in differing circumstances so as to test the extent to which a residual effect in a given area is manifested and functions in new situations.

Further Studies Recommended

Three plans for a more definite study of the comparable effects of Montessori and other pre-school programs are suggested: 1) an identical twin study using several sets of identical twins (born pre-maritally) placing one of each set in a Montessori pre-school, the other in one of several other pre-school. After a period of one year and again after two years, evaluate through careful observation, guided by specific descriptions of behavior criteria a wide variety of definite tasks in varying situations, both within and apart from the pre-school learning environment. 2) A comparative study of four pre-school environments: Montessori, enriched non-Montessori child development center, traditional pre-school and no pre school--all drawing children from the same community (See Appendix B for Suggested Plan for Continuing Study). Evaluation would be undertaken as described above with data submitted to factor and discriminant analysis. 3) A follow-up study of initially evaluated children: to test the extent to which whatever early differences were noted, continue to be in evidence three, five, eight years later.

SUMMARY

SUMMARY

The research project consists of two phases, both attempting to appraise the effects of a common variable: Montessori pre-school education. In Phase I two groups of 21 pre-school age children (one group attending a Montessori school, the other the Control group attending a neighboring non-Montessori pre-school), matched in all important variables (age, sex, I.Q., socio-economic status, parental education etc.) were evaluated by means of standardized tests as well as by expecially designed outcomes rating scales at the beginning and at the end of the experimental period. The children in both groups were rated on 27 variables under eight pre-school learning outcomes categories. Phase II, primarily exploratory in nature, attempted to appraise what differences, if any, were noticed by teachers in public and private schools among children in the primary grades who had attended Montessori pre-school, no pre-school, or other-than-Montessori pre-school. A trained researcher, using rating scales, interviewed the teachers and had them rate the children involved on an Outcomes Rating Scale. A trained graduate student also interviewed the parents of the children in the two groups of Phase I to explore the extent to which intended Montessori pre-school outcomes carried over and were exhibited to a noticeable degree in the home.

A comparison of raw data charts pointed up greater gains for Montessori children in intelligence and in specific trait development (initiative, persistence, independence, self-confidence, self-control, acuity in sensory perception, concentration, positive attitude toward learning and purposeful activity). No consistent pattern of difference between the groups was in evidence in creativity outcome.

Data Analysis

In order to loacte basic factors operating in the total set of variables, the teachers ratings were factor analyzed so that the investigators could get: 1) a factor pattern (least-squares fit to all the groups in our study), 2) the factor variances for each group, and 3) intercorrelations among factors for each group. A covariance matrix among all variables for each group was obtained, as well as a mean covariance matrix which was factored, producing a principal axis factor pattern.

Of the eight factors extracted, only three qualified for retention: 1) positive attitude toward learning, 2) sensory motor coordination and 3) verbal ability. These three principal axis factors were rotated to the binormamin criterion of oblique simple structure.

Authors also used the date on the above three factors as input for discriminant analysis. By subtracting the 1965 score matrix from the 1964 change matrix the authors secured a matrix of change scores on each factor for each of the two groups (Montessori and Control). These change score matrices were subjected to discriminant analysis to derive new variates.

The discriminant coefficient matrix was inverted, yielding the discriminant pattern, which is analaguus to the factor pattern mentioned above.

Analysis of variance was applied to the data to discover significant and/or insignificant differences between the Montessori and Control groups.

Conclusion

The investigators found that the superior gains (27 percent greater) in verbal ability made by Montessori trained children over the other-than-Montessori-trained children were statistically significant at the p. .001 level of confidence.

Of the eight factors which emerged from a factor analysis of the variables rated in this study, only three: positive learning attitude, sensory motor coordination and verbal ability met statistical criteria for retention and further discriminant analysis. The authors found positive correlations between positive learning attitude and verbal ability as well as with sensori motor coordination, but with the latter factor, only in the Montessori group, where many of the sensori-motor learning activity involve manipulative mathematics devices designed to develop the child's concept of number. The investigators suspect the influence of general intelligence accounts for the positive correlations among these factors. Group variance (higher for the Montessori than for Control children) was significant at p. .05 when correlations of positive learning attitude were compared with sensori-motor coordination.

However, Montessori-Control group variances of the positive learning attitude factor and of the sensori-motor coordination factor were not significantly different.

Of the five to five-and-one-half year olds in this study, Montessori-trained children (67 percent and 94 percent) seem to have acquired greater "reading readiness" and "first grade readiness" than those in the Control group (30 percent and 50 percent).

Primary teachers in the public and parochial schools to which the children in this study transferred found no particular adjustment problems "peculiar to Montessori-trained children." They found no significant differences in creativity between children coming from Montessori and other pre-schools. They rated children who had attended Montessori pre-school superior (at a statistically significant level) to their peers in interest in learning, independence, interpersonal relations, leadership and learning ability.

Nearly twice as many Montessori as Control group parents noted a definite carry-over into the home of pre-school learning outcomes.

A main weakness of the study was attempting to measure certain pre-school, difficult-to-measure learning outcomes for which adequate evaluative instruments were not available.

Further questions are raised by this study:

1. Would adequate measures of pre-school outcomes uncover significant differences where this study found none? Are certain traits influenced by one pre-school approach rather than the other which this study may not have measured?

2. Will the differences which the investigators found continue in evidence as the child advances through school?

The development of refined measures of pre-school outcomes along with follow-up studies could provide an answer.

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APPENDIX - A

INSTRUMENTS USED

APPENDIX -- A

Forms Illustrated:

1-a Child Information

2. General Evaluation of Child and his Adjustment to School

3. Home Evaluation Criteria Scale

4.a Pre-School Outcomes Rating Scale

5. Outline of Structured Interview with Teachers

6. Inventory of Family Life and Children

7. Socio-Economic and Educational Background

Forms Not Illustrated:

1. Early experimental editions of the Pre-School Outcomes Rating Scale and Explanation

2. Form 1 -- General Data Sheet (used to compile all data on subjects)

3. Summary Data Sheet (used in Phase II to collect general information about subjects)

DE PAUL UNIVERSITY Pre-School Evaluation

CHILD INFORMATION

1. Full Name of Child____
2. Address____
3. Birthday: Month________Day_______Year_______ [age calculation__]
4. Number of other children in this family?______Male____Female____
5. Position of this child in the family. Oldest child is #1 _________
6. How would you rate the Socio-Economic level in which the child is being reared: (circle one)

   Very low--Lower Average--Average Middle--Upper Middle--Upper--Higher
7. Is this child right or left handed? Right handed ☐ Left handed ☐
8. Health of Child: Below Average ☐ Average ☐ Above Average ☐
9. Disposition of child: (check one)

   Always happy and cooperative ☐ Sometimes ☐ Usually unhappy ☐
10. How would you as parents rate this child's ability to learn and grasp new ideas? (check one)

    Below average ☐ Average ☐ Above average ☐

* *

NAME OF FATHER___________________________AGE____________________

Occupation____

Please circle the highest grade completed:

1 2 3 4 5 6 7 8 9 10 11 12 College 1 2 3 4 Degree

Advanced Degree 1 2 3 4

Positions held in organizations, institutions or community (List)

____

____

NAME OF MOTHER___________________________AGE____________________

Occupation____

Please circle the highest grade completed:

1 2 3 4 5 6 7 8 9 10 11 12 College 1 2 3 4 Degree

Advanced Degree 1 2 3 4

Positions held in organizations, institutions or community (List)

____

____

U.S.O.E. Project 2337 form 1-a

DE PAUL UNIVERSITY **PRE-SCHOOL EVALUATION**

GENERAL EVALUATION OF CHILD AND HIS ADJUSTMENT TO SCHOOL

FORM 2--For use during interview with teacher. Revised and Reproduced April, 1965

NAME OF CHILD____________________ GRADE________ BIRTH________

NAME OF SCHOOL____________________ TEACHER____________

DATE OF INTERVIEW________________ LOCATION____________

INTERVIEWED BY________________ TIME__________ COND________

CHECKSHEET EXPLAINED__________ SCALE LEFT________ SCALE RETURNED________

SUBJECT CONSIDERED NORMAL ____________________

GENERAL NOTATIONS:

EMOTIONAL STABILITY:

1. As far as teacher knows child comes from emotionally stable home__________
2. Child has never exibited serious emotional problems______________
3. Child has never been medically treated in any way for emotional problems______

PHYSICAL CONDITION:

1. Child has no physical handicaps____________________

SOCIAL ADJUSTMENT:

1. How does child get along with peers? Poor----Less Av------Av----Better--Exel

INTEREST IN LEARNING:

1. Less than Average_____ More than average_______ Same as others__________

CREATIVITY:

1. LESS THAN AVERAGE__________ MORE THAN AVERAGE________ SAME AS OTHERS_____

EXPLAIN:

FORM-2

DE PAUL UNIVERSITY
U.S.O.E. Coop Research
Project Nr-2337

Pre-School Evaluation

Dr. Urban Fleege
John Rackauskas

HOME EVALUATION CRITERIA SCALE

FORM-3

NAME ____________________
SCHOOL ____________________
Group ____________ Age ________
Date of rating ____________________

SUMMARY

	0	1	2	3	4	Average
1. ATTITUDES & HABITS						
Independence						
Initiative						
Self-confidence						
Persistence						
Self-Control						
Concentration						
2. SENSORY ACUITY & PERCEPTION						
Sense of Order						
Sharpness of Observation						
3. INTELLIGENCE						
Curiosity						
Skills						
Ideas						
Environment						
Purposefulness						
4. SOCIALIZATION						
5. CREATIVITY						
6. MOTOR COORDINATION						
TOTALS →						

VALUATION: Rating of this child is on a five (5) point scale. Each of the numbers has the following valuation:

0 = No--Never
1 = Seldom or poor
2 = Average or somewhat
3 = Much, above average
4 = Excellent or always

I. ATTITUDES AND HABITS:

Independence

1. Child gets drink unassisted.

0 1 2 3 4

2. Child uses knife for spreading.

0 1 2 3 4

3. Child washes own face (unassisted)

0 1 2 3 4

4. Child cares for self in toilet.

0 1 2 3 4

5. Child puts on and removes own coat and dress.

0 1 2 3 4

Initiative

1. Child likes to volunteer assistance or help.

0 1 2 3 4

2. Child likes to be busy on learning tasks.

0 1 2 3 4

3. Child starts a new task only after completion of one.

0 1 2 3 4

4. Child initiates a new activity without suggestion.

0 1 2 3 4

I. ATTITUDES AND HABITS: (Continued)

Self-confidence

1. Child has an assertive mind. Gives opinions, likes,dislikes.

   0 1 2 3 4

2. Child is aware of own things and clothes [i.e.These are mine].

   0 1 2 3 4

3. Child dresses self without supervision.

   0 1 2 3 4

4. Child will attempt to perform a new skill after having watched the operation or having listened to directions. (without spcific teaching of the operation)

   0 1 2 3 4

Persistence

1. Child will complete task.

   0 1 2 3 4

2. Child completes task before going on to another.

   0 1 2 3 4

3. If child encounters difficulty, he will complete cycle of work without help.

   0 1 2 3 4

4. If child encounters difficulty, he will ask for help to complete task.

   0 1 2 3 4

Self Control

1. Child will accept correction or criticism without negative reaction--temper.

   0 1 2 3 4

I. ATTITUDES AND HABITS: (Continued)

Self Control (Continued)

2. Child will pass over minor affront without hostility.

0 1 2 3 4

3. Child does what is expected of him in the home situation. Never lets a situation throw him.

0 1 2 3 4

4. Child will perform a new task when asked and sets his own controls. No repeating or coaxing necessary.

0 1 2 3 4

Concentration

1. Child cuts with scissors.

0 1 2 3 4

2. Child can write numbers and letters from dictation.

0 1 2 3 4

3. Child helps with little household activities regularly.

0 1 2 3 4

4. Child initiates own play activities (without suggestion).

0 1 2 3 4

5. Child uses pencil or crayons for drawing.

0 1 2 3 4

6. Child listens to stories ½ hour out of book or during storytelling.

0 1 2 3 4

TOTAL RATINGS FOR BLOCK I ______________

II. SENSORY ACUITY AND PERCEPTION:

Sense of Order

1. Child likes to have things return to their proper places.

   0 1 2 3 4

2. Child likes to have clothes and toys neatly arranged.

   0 1 2 3 4

3. Child uses time words -- lunchtime, It's time, etc.

   0 1 2 3 4

4. Child refers to happenings of the past.

   0 1 2 3 4

5. Child plays ahead -- long-range goals for tomorrow, next week or next month.

   0 1 2 3 4

Sharpness of observation

1. Child compares new objects with others while handling, feeling.

   0 1 2 3 4

2. Child identifies the color of objects.

   0 1 2 3 4

3. Child distinguishes between letters of alphabet.

   0 1 2 3 4

4. Child distinguishes numbers easily.

   0 1 2 3 4

5. Child distinguishes squares, triangles and circles (differences and similarities).

   0 1 2 3 4

III. INTELLIGENCE:

Curiosity

1. Child would like to learn to write.

0 1 2 3 4

2. Child is interested in copying numbers and letters.

0 1 2 3 4

3. Child attempts to add and subtract numbers within five.

0 1 2 3 4

4. Child is interested in learning to read.

0 1 2 3 4

5. Child uses many different words in speaking vocabulary.

0 1 2 3 4

6. Child talks in short sentences--content adequate.

0 1 2 3 4

7. Child enjoys being read to.

0 1 2 3 4

8. Child is quick to notice unfamiliar words in conversations and wants to know meanings.

0 1 2 3 4

9. Child asks many questions indicating a desire to know about many things.

0 1 2 3 4

10. Child knows where he lives---house number and street

0 1 2 3 4

11. Child knows how events of day relate or take place (i.e., morning, noon).

0 1 2 3 4

III. INTELLIGENCE: (Continued)

Curiosity (Continued)

12. Child goes about the neighborhood unassisted.

0 1 2 3 4

13. Child can tell how old he is.

0 1 2 3 4

14. Child knows the days of the week, and relates information.

0 1 2 3 4

15. Child enjoys listening to conversations or stories about family and surroundings.

0 1 2 3 4

Purposefulness:

1. Child asks "How to do" and "Why do" certain things--purpose.

0 1 2 3 4

2. Child uses a pencil for printing or writing or trying to use it constructively.

0 1 2 3 4

3. Child avoids simple hazards for own self-protection.

0 1 2 3 4

4. Child has insight into purpose of materials and uses them as intended--not hammering, banging, hitting.

0 1 2 3 4

5. Child acts for specific purpose rather than random action.

0 1 2 3 4

IV. SOCIALIZATION:

1. Child likes to play with other children or be in their company.

0 1 2 3 4

IV. SOCIALIZATION: (Continued)

2. Child can play outdoors with another child without supervision for at least 30 minutes.

   0 1 2 3 4

3. Child shares toys with other children while at play.

   0 1 2 3 4

4. Child relates his experiences to others--enjoys doing it.

   0 1 2 3 4

5. Child shows some awareness of the rights of others.

   0 1 2 3 4

V. *CREATIVITY:*

1. Child likes to deviate from an established routine. Says: "Let's do it this way."

   0 1 2 3 4

2. Child uses objects in unusual ways.

   0 1 2 3 4

3. Child plays "make believe." (Artistic representation)

   0 1 2 3 4

4. Child enjoys exaggeration or tall tales.

   0 1 2 3 4

5. Child uses unusual color combinations.

   0 1 2 3 4

VI. MOTOR COORDINATION:

1. Child can combine three blocks to make a bridge.

   0 1 2 3 4

VI. MOTOR COORDINATION: (Continued)

2. Child buttons coat and dresses unassisted.

0 1 2 3 4

3. Child seems well coordinated in pulling a wagon, running, jumping, throwing a ball and catching it, and walking.

0 1 2 3 4

4. Child prints simple words.

0 1 2 3 4

5. Child colors within a given space--i.e., figures in a coloring book. How well does child stay within given space.

0 1 2 3 4

END--Home Evaluation Criteria Scale [M.Courtney]

Number of parents present? Mother ☐ Father ☐

If one parent is not present, what arrangements will be made to interview him/her?

REMARKS:

DE PAUL UNIVERSITY

PRE-SCHOOL EVALUATION PROJECT

Dr. Urban Fleege
J.A. Rackauskas

PRE-SCHOOL OUTCOMES RATING SCALE

FORM 4 explanation

This scale is designed as an aid in helping you evaluate the characteristic behavioral response of children in a variety of catagories. It yeilds a measure of the child's emotional adjustment as revealed in several personal-social traits.

SPECIAL INSTRUCTIONS:

1. Rate each child along the scale for each trait as he or she compares with other children--not only of your immediate classes but also other individual groups or individual children of the same age and sex whom you know.

2. Do not judge the child in relation to ideal standards of how you feel children of this age should behave, but rate him simply in comparison with cultural norms (as defined in NO:1) and your best understanding of how the behavior in question is usually found in children of the same age.

3. Rate the child on each trait independently of how you rate him on the other traits, insofar as you feel you can.

4. Try to avoid the frequent inclination of raters to overuse the middle sections of the scale (average ratings)--unless you feel the child really performs at an average level of efficiency for the particular dimension in question. (This also applies to some degree for the tendency of some raters to lean toward either extreme.)

5. Try to have each rating cover the child's average or characteristic mode of functioning over recent weeks and not merely that of the moment or his best or poorest level.

6. At the end of the rating scale please make an estimate of the degree of confidence you have in the ratings for the child. Note that this estimate is made along a scale running from 0-7 points.

7. The attached pages define the traits that you are being asked to rate. Please read these over very carefully, so that you are aware of what each trait refers to.

Thank you.

I. ATTITUDE

1. Positive and Happy

Never seems happy. Always has the attitude of wishing he were not in school. Cries often. Frequently expresses desire to be home with mother or family.

Generally appears cheerful. At times will pout or for a short period of time may appear displeased with something. Generally seems to be satisfied with the school situation.

Always appears happy and cheerful. Smiles almost all of the time. Is never discouraged. Always appears to be happy about school.

-3 -2 -1 0 1 2 3

2. Cooperative-Interested in Learning.

Never seems interested in doing new tasks. Prefers to watch others. Opposes teacher when asked to do something. Seems to balk at nearly every learning situation. Wanders around aimlessly. Copies others instead of involving self.

Most of the time appears satisfied with accomplishments. Usually accepts challenge provided. At times needs encouraging. Generally accepts teacher's suggestions. Moderate curiosity about knowing environment.

Shows keen delight in accomplishing tasks. Eager to go on to harder tasks. Very willing to accept any new challenge posed for him. Real curiosity in learning more about environment.

-3 -2 -1 0 1 2 3

II. BEHAVORIAL CHARACTERISTICS

3. Self Control, Responsive to Discipline

Cries when corrected by teacher. Seems to resent all correction. Appears hostile when things do not go his way. Clowns around to attract attention. Disturbs. Extremely defensive.

Generally able to cope with most situations, without getting very upset. Accepts criticism fairly well. Rarely angry or violent. Passes over minor affronts. Average normalization of behavior.

Has good self control. Never lets any situation get the best of him. Able to accept fair criticism. No visible sign of anger to any personal affronts. Responds excellently to what is required.

-3 -2 -1 0 1 2 3

4. Ability to Attend, Follow Directions

Never seems to know what to do. Needs constant reexplaining. Flighty attention. Poor habits of concentration.	Average attention span, Occasionally needs reexplaining. Generally able to work well alone.	Seldom (if ever) needs directions repeated. After being shown is able to do work or task by self. Wider than average attention span.

-3 -2 -1 0 1 2 3

5. Independence, Confidence in Self

Always has the attitude "I can't do it". Feels completely inadequate about carrying out any task. Is constantly at teacher to help him. Follows teacher or other children around continually.	Generally feels able to carry on a task alone. Seldom has to ask for additional help. Readily undertakes tasks on own.	Always has positive attitude in doing work. Feels quite confident that he can do whatever he sets out to do. Seldom has to ask for help. An individualist, Prefers to be a leader.

-3 -2 -1 0 1 2 3

6. Relations with other Children

Wants nothing to do with other children. Prefers to work alone. Rejects help from other children. Almost no consideration for others. Wants to be boss of group activity. Knocks down other's projects. Tattles on others continually.	Gets along well with peers most of the time. At times a conflict with another child may arise. In general enjoys group activity. Occasionally tattles on others. Respects other's rights when they are engaged in a task. Occasionally works with others in a learning task,	Gets along well with peers. Very willing to share with others. Likes to participate in group activities. Very considerate of others. Enjoys working with group on projects. Is very well liked.

-3 -2 -1 0 1 2 3

7. Relations with Teachers

Rejects teacher or assistant help. Fearful in presence of teacher. Unresponsive, sullen. Avoidance tendencies toward teacher.	Moderate friendliness towards teacher and assistant. Accepts teacher's directions. Seems to be fairly comfortable in presence of teacher.	Gets along very well with teachers. Is open, friendly, and responsive. Tries to cooperate with teacher and do as suggested.

-3 -2 -1 0 1 2 3

III. WORK HABITS

8. Initiative, Use of Time

Never or seldom initiates activity by self. Always needs prodding to begin. Seldom if ever volunteers Frequently wastes time. Only responds as directed.	Sometimes begins a new activity on own. Occasionally offers to assist. After shown will engage in activity by self. Usually keeps self busy.	Usually initiates new activity by self. A self-starter. Most always starts a new task after completing one. Frequently volunteers. Always busy on learning tasks.

-3 -2 -1 0 1 2 3

9. Handling of Materials with Purpose

Uses materials haphazardly. No insight into use or purpose. Uses materials to hammer (if wrong purpose). Bangs apparatus. Careless handling.	Generally uses materails as intended. Uses properly after being shown several times. Occasionally lapses into careless or erroneous use. Shows growth in use.	Evidences insight into purpose, rationale, of materials. Careful about using materials as intended. Handles materials carefully. Excellent progress in growth through use.

-3 -2 -1 0 1 2 3

10. Persistence, Completes Cycle of Work

Gets easily distracted. Hardly ever finishes a task. If task is least bit difficult will not attempt to do it. Begins many things but completes few, if any. Unable to carry on routine activity alone. No identifiable interests. Flighty habits.	Generally completes tasks. Will persevere for quite a while on a difficult task before giving up. Generally finishes one task before going on to another.	Most always completes work set out to do. If something appears difficult keeps on going until task is correctly accomplished. Always completes one task before going on to another. Carries on routine activities by self. Keeps on searching until he finds what he is looking for.

-3 -2 -1 0 1 2 3

11. Sense of Order

No or little evidence of. must be frequently reminded about keeping things where they belong. Seldom returns objects to proper place unless reminded. Undisturbed by "a mess".	Some evidence of. Usually returns things to proper place. Occasionally reminds others if things not where they belong. Sometimes unaware when things in disorder.	Unhappy if things not in proper place. Keen interest in having things neatly arranged and "everything in its place."

-3 -2 -1 0 1 2 3

IV. MOTOR COORDINATION

12. Eye-hand Coordination

Clumsy and awkward. Seems to have very little left to right sequence. Awkward in keeping within designated limits. Has no idea as to top, bottom, etc.	Moderate eye-hand control for age. Able to follow from left to right and up and down easily. Some diffused or poorly controlled movement.	Very well coordinated. Follows left to right and up and down movement without fail. Can find top left, etc., quickly. Quite clear-cut execution of movement without trouble. Easily conforms to limits.

-3 -2 -1 0 1 2 3

13. Use of Pencil, Scissors (Fine Muscles)

Lacks control: has trouble holding pencil, scissors, etc., correctly. Is unable to cut evenly around large objects, or follow large lines. Unable to or has difficulty in tracing stencils. Most always outside lines in coloring.	Able to do fair amount of detail work. Holds pencil correctly most of the time with little help. Able to cut around most objects that are not too detailed. Fairly well able to trace. Colors mainly within lines.	Able to use pencil to draw some details. Able to cut around small corners, etc. Able to trace objects well, even those with some detail. Able to do an excellent job of coloring within lines. Can use small items without trouble.

-3 -2 -1 0 1 2 3

14. Practical Life Materials

Unable to accomplish most practical life tasks. Difficulty in dressing and undressing. Unable to work well with "frames". Lacks control in use of broom, polish rag, etc. No interest (despite need) in practical life tasks.	Generally can dress and undress self without much difficulty. Does fairly good job of pouring without spilling. Most often uses correct method to mop, wash, polish, etc.	Accomplished in using "frames". Dresses and undresses self efficiently. Pours without spilling. Always uses correct methods in practical life tasks. Carries over learning into daily routine.

-3 -2 -1 0 1 2 3

15. Large Muscle Activity (Running, Throwing)

Trips continually over own feet. Unable to hold on to balls, objects, etc. Awkward in throwing, walking. Poor large muscle coordination. Difficulty in walking on line.	Generally able to run well. At times may trip. Average in aiming and finding target. Can line up blocks and rods. Fairly graceful considering age. Walks well on line.	Graceful, well coordinated in walking, throwing, running, etc. Excellent grasp on objects. Good timing and muscle coordination. Good balance.

-3 -2 -1 0 1 2 3

V. Sensory Acuity

16. Interest in Sensory Materials--Tasks

Lacks interest in most sensory apparatus. Doesn't like to handle objects. Difficulty in noting the obvious. Limited enthusiasm for a few sensory tasks.	Usually interested in seeing and feeling new objects. At times can see beyond the obvious. Interested in discriminating main differences in sensory tasks.	Anxious to work with sensory apparatus. Enthusiastic about noting details unobvious to the eye, or other senses.

-3 -2 -1 0 1 2 3

17 Progress in Distinguishing Differences

Even after long practice has difficulty distinguishing obvious diffeences. Observes few or no details. Limited progress in certain sense areas.	Can distinguish between shapes and objects quite well after observing a while. Can pick out some details. Distinguishes main differences in most sensory objects. Moderately alert to distinguishing features.	Able quickly and clearly to see differences. Can distinguish colors, numbers, letters, etc., without much difficulty. Can distinguish between shapes. Distinguishes details easily.

-3 -2 -1 0 1 2 3

18. Clarity of Perceptions

Foggy grasp of reality of material, objects in environment. Frequently, "all mixed up". Mixes up objects. Confuses distinguishing features which identfy objects.	Recognizes major features of elements in child's world. Can distinguish between such objects as squares and circles. Sees major details. Evidences clarity of grasp in his ability to match and pair.	Clear grasp of identifying features of elements of child's world. Able to recognize differences between such objects as circles and ovals. Perceives great many details. Evidences grasp in using percepts in conversation and in dissimilar tasks where applicable.

-3 -2 -1 0 1 2 3

VI Language Skills

19. Intelligible Articulation

Sloppy expression of sounds. Mumbles or stutters. Seems to have no train of thought. Does not sound complete word, or makes erroneous sound. Difficult to understand when talks.	Generally enunciates clearly. Proper sounds for most words and syllables. Most often knows what he wishes to say and able to say it with small amount of difficulty.	Very clear enunciations. Able to express self clearly. Language is easily understood. Superior in sound quality and correctness.

-3 -2 -1 0 1 2 3

20. Self Expression in Simple Sentences

Unable to express self. Words come out all jumbled. Seldom speaks in complete sentences. Tends to be uncommunicative. Uses minimum of words to express needs.	Usually speaks in sentences. At times gets confused, but usually good language. Average facility in expressing needs and feelings.	Uses complete sentences in speaking. Always knows what he wants to say an and says it clearly. Words follow correct sequence. Shows enthusiasm when relating a pleasing experience.

-3 -2 -1 0 1 2 3

21. Vocabulary (Word Growth)

Still has babyish vocabulary. Uses same words over and over. Limited vocabulary. Lacks interest in learning new words.	Uses vocabulary comparable with his age. At times may revert to baby words or use words of advanced nature incorrectly. Moderately interested in learning new words.	Uses words beyond the normal range for age and understands meanings of these words. Considerable interest for new or advanced words. Love for words.

-3 -2 -1 0 1 2 3

22. Grasp of Verbol Symbols (Sounds, Alphabet)

Recognizes few, if any of the letters of the alphabet. Knows only a few sounds. Small interest in verbal tasks.	Knows majority of letters of alphabet, and accompanying sounds. Can write many of the letters and say sounds which accompany them. Fair interest in verbal activities.	Recognizes all letters of alphabet and their sounds, Can say sounds to perfection. Delighted in verbal tasks. Interest in books and reading.

-3 -2 -1 0 1 2 3

VII. MATHEMATICS

23. Interest in Math Materials - Tasks

Little or no interest in working with Math materials.	Moderate interest. Works with math materials for limited period. Occasionally asks "how many?" or volunteers to tell "how many".	Very eager to work with math materials. Evidences carry-over of math and number interest to outside world.

-3 -2 -1 0 1 2 3

24. GROWTH IN NUMBER CONCEPTS

LACKS UNDERSTANDING OF MEANING OF EVEN SMALL NUMBERS LIKE 1,2,3, ETC. NOT ABLE TO TELL AGE WITH UNDERSTANDING.	HAS KNOWLEDGE OF THE MEANING OF SMALL NUMBERS. WORKS WITH RODS, ETC. IN SIMPLE ADDING AND SUBTRACTING. CAN TELL AGE WITH UNDERSTANDING.	GOOD UNDERSTANDING OF MEANING OF NUMBERS. CAN DO SIMPLE ADDITION, SUBTRACTION AND MULTIPLICATION. APPLIES CONCEPTS OUTSIDE CLASSROOM. LIKES TO TELL "HOW MANY" AND "HOW MUCH".

-3 -2 -1 0 1 2 3

25. COUNTING ABILITY

UNABLE TO COUNT BEYOND TEN WITH ACCURACY. NO TRANSFER TO NEW SITUATIONS.	ABLE TO COUNT TO ONE-HUNDRED BY ONES AND TENS. CAN COUNT OBJECTS IN SAME CATEGORY. OCCASIONALLY ABLE TO TRANSFER COUNTING ABILITY OUTSIDE LEARNING TASK.	COUNTS SINGULARLY, TENS, HUNDREDS, ETC. ABLE TO COUNT DIVERSE OBJECTS, SETS, ETC. ABLE TO TRANSFER COUNTING ABILITY WITH FACILITY OUTSIDE CLASSROOM.

-3 -2 -1 0 1 2 3

26. CREATIVITY-IMAGINATION

NO EVIDENCE OF IMAGINATION. MATTER-OF-FACT. PURELY IMITATIVE. RIGIDLY FORMAL AND TRADITIONAL. NO DEPARTURES FROM WHAT SHOWN. MECHANICAL, ROTE-LIKE; STEREOTYPE.	OCCASIONALLY EVIDENCES DEPARTURES FROM CUSTOMARY WAY OF DOING THINGS. SOME WILLINGNESS AND SUCCESS IN TRYING DIFFERENT USES, WAYS ETC. OCCASIONALLY PLAYS "MAKE BELIEVE".	FREQUENTLY EVIDENCES ORIGINAL, DIVERGENT THINKING. TRIES DIFFERENT APPROACHES AND SOLUTIONS. ENJOYS DOING THINGS DIFFERENTLY. USES APPARATUS IN UNUSUAL WAYS. IMPERSONATES OBJECTS IN ENVIRONMENT, HAS IMAGINARY FRIENDS.

-3 -2 -1 0 1 2 3

ESTIMATE OF OVER-ALL CONFIDENCE IN MY RATINGS:

0	1	2	3	4	5	6
NO OR LITTLE CONFIDENCE		LIMITED CONFIDENCE		A FEW RESERVATIONS		MUCH CONFIDENCE

****

DE PAUL UNIVERSITY **Pre-School Evaluation**
Form - 4-A

OUTCOMES RATING SCALE

NAME OF CHILD______________________________ SCHOOL______________________

BIRTH ______________________________ DATE OF RATING______________________

" "

I. ATTITUDE

1. Positive and Happy

-3 -2 -1 0 1 2 3

2. Cooparative, Interested in Learning

-3 -2 -1 0 1 2 3

II. BEHAVIORAL CHARACTERISTICS

3. Self Control, Responsive to Discipline

-3 -2 -1 0 1 2 3

4. Ability to Attend, Follow Directions

-3 -2 -1 0 1 2 3

5. Independence, confidence in self

-3 -2 -1 0 1 2 3

6. Relations with other children

-3 -2 -1 0 1 2 3

7. Relations with teachers

-3 -2 -1 0 1 2 3

USOE Coop Research Project 2337

III. WORK HABITS

8. Initiative, Use of Time

-3 -2 -1 0 1 2 3

9. Handling of Materials with purpose

-3 -2 -1 0 1 2 3

10. Persistence, Completes Cycle of Work

-3 -2 -1 0 1 2 3

11. Sense of Order

-3 -2 -1 0 1 2 3

IV. MOTOR COORDINATION

12. Eye-Hand Coordination

-3 -2 -1 0 1 2 3

13. Use of Pencil, Scissors (fine muscle activity)

-3 -2 -1 0 1 2 3

14. Practical Life Materials

-3 -2 -1 0 1 2 3

15. Large Muscle Activity (Running, Throwing)

-3 -2 -1 0 1 2 3

V. SENSORY ACUITY

16. Interest in Sensory Materials--Tasks

-3 -2 -1 0 1 2 3

17. Progress in Distinguishing Differences

-3 -2 -1 0 1 2 3

18. Clarity of Perceptions

-3 -2 -1 0 1 2 3

VI. LANGUAGE SKILLS

19. Intelligible Articulation

-3 -2 -1 0 1 2 3

20. Self Expression in Simple Sentences

-3 -2 -1 0 1 2 3

21. Vocabulary (word growth)

-3 -2 -1 0 1 2 3

22. Grasp of Verbal Symbols

-3 -2 -1 0 1 2 3

VII. MATHEMATICS

23. Interested in Math Materials--Tasks

-3 -2 -1 0 1 2 3

24. Growth in Number Concepts

-3 -2 -1 0 1 2 3

25. Counting Ability

-3 -2 -1 0 1 2 3

VIII. CREATIVITY---- IMAGINATION

26. Creative Use of Materials

-3 -2 -1 0 1 2 3

27. Evidences a living imagination

-3 -2 -1 0 1 2 3

CONFIDENCE IN RATINGS

0 1 2 3 4 5 6

RATERS NAME ____________________

DE PAUL UNIVERSITY
Pre-School Evaluation

Urban H. Fleege, Ph.D.
Project Director
John A. Rackauskas
Research Fellow

OUTLINE OF STRUCTURED INTERVIEW WITH TEACHERS

FORM 5

Nature and Extent of Ease of Adjustment in 1st Grade
or contrarily, extent and nature of adjustment difficulties

NAME OF CHILD ______________________ SCHOOL ______________________

BIRTH ______________________ TEACHER ______________________ DATE ______________

Rev. 4/65" "

1. Does teacher remember anything specific about child's entrance into her class?

2. Any positive qualities; eg. (more so than average child in class)

   a. seemed at home in class
   b. mixed well with other children
   c. confident and sure of self vs. diffident, shy and withdrawn
   d. positive, favorable attitude, happy to be going to school
   e. friendly and communicative with teacher
   f. independent, knows how to help self, remove own colthing, etc.
   g. evidence of a habit of order
   h. evidence of good habits of attention
   i. evidence of good work habits: initiative, persistence
   j. could follow directions easily
   k. self-controlled; responsive to discipline; cooperative
   l. evidenced good motor coordination; handling of pencil, scissors, etc.
   m. notices similarities and differences readily
   n. ability to express self in simple sentences
   o. understands number concepts; able to count, better than average.
   p. understands what is said readily, good vocabulary, better than average

q. interest in reading; can read a few words (more advanced than average)

r. can add small numbers (e.g. 2+2, 2+3)

s. recognizes letters of alphabet (a few, about half, most, all)

t. can write certain letters

u. can draw recognizable forms or pictures

v. articulates words distincly

w. recognizes rights of other children

x. ability to concentrate

y. evidences a lively imagination

z. is in (fast, slow, average) group; how in ____grade.

3. Any negative qualities particularly noted (i.e. evidences more of uncooperative, negative, attitude or difficulties in fitting into class etc..):

a. runs around and does not keep to his assigned place

b. talks out of turn

c. listening and attending when teacher is talking poor

d. attention wanders frequently, day-dreams, stares into space, not knowing what is going on; lacks ability to concentrate

e. seems bored after short while

f. presents discipline problems such as shoves others around, etc.

g. says he doesn't like school

h. uncooperative, wants to do things his own way

i. not interested in doing what class activities teacher assigns or suggest

j. have to pull responses out of child

k. does not enter wholeheartedly into school activities

l. exhibits little or no initiative

m. is below average his age group in: ________________, ______________

______________________, __________________, ________________.

4. Teacher's knowledge of Montessori

5. Teacher's knowledge of Alcuin and attitude toward it

6. Attitude of teacher toward Montessori
    a. interested, positive
    b. uninterested, doubtful
    c. negative

7. Observation of Montessori Pre-Schooler/ comparison of him with other children in the classroom:

    a. note qualities in #2

    b. note qualities in #3

    c. unable to observe the child_____

8. Any tests given in the school thus far? (name of test, level, date given)

OTHER NOTATIONS AND COMMENTS:

COMPARISON TO PEERS IN REFERENCE TO:

NUMBER ACTIVITIES: LESS ADVANCED__________ SAME AS PEERS________ MORE ADV__________

READING ACITIVITIES: LESS ADVANCED__________ SAME AS PEERS________ MORE ADV__________

WRITING ACTIVITIES: LESS ADVANCED__________ SAME AS PEERS________ MORE ADVANCED_____

DE PAUL UNIVERSITY
Pre-School Evaluation
FORM - 6

INVENTORY OF FAMILY LIFE AND CHILDREN

INSTRUCTIONS

Please read each of the statements below and rate them as indicated. Please do so by drawing a circle around the "A" if you strongly agree. Draw a circle around the "a" if you mildly agree. Draw a circle around the "D" if you strongly disagree. And finally, draw a circle around the "d" if you mildly disagree.

There are no right or wrong answers. Answer according to your own opinion. It is very important to the study that all questions be answered. Many will seem alike, but all are necessary to show slight differences of opinion.

You need not place your name anywhere on this form. You have been provided a stamped self-addressed envelope. Simple fill out this inventory and mail it back.

THANK YOU.

Remember: "A" indicates strong agreement.

"a" indicates mild agreement.

"d" indicates mild disagreement.

"D" indicates strong disagreement.

ADAPTED FROM

Earl S. Shaefer and Richard Bell. Development of a Parental Attitude Research Instrument. National Institute of Mental Health.

1. Children should be allowed to disagree with their parents if they feel their own ideas are better. A a d D
2. A good mother should shelter her child from life's little difficulties. A a d D
3. Some children are just so bad they must be taught to fear adults for their own good. A a d D
4. You must always keep tight hold of baby during his bath for in a careless moment he might slip. A a d D
5. People who think theycan get along in marriage without arguments do not know the facts. A a d D
6. Children will get on any women's nerves if she has to be with them all day. A a d D
7. A child should be taught to avoid fighting no matter what happens. A a d D
8. One of the worst things about taking care of a home is that a woman feels she can't get out. A a d D
9. If you let children talk about their troubles they end up complaining even more. A a d D
10. Mothers would do their job better with the children if fathers were more kind. A a d D
11. A mother should make it her business to know everything her children are thinking. A a d D
12. Children would be happier and better behaved if parents would show an interest in their efforts. A a d D
13. Children should be encouraged to tell their parents about it whenever they feel family rules are unreasonalbe. A a d D
14. A mother should do her best to avoid anydissappointment for her child. A a d D
15. It is frequently necessary to drive the mischief out of a child before he will behave. A a d D
16. All young mothers are afraid of their awkwardness in handling and holding the baby. A a d D
17. Some times it is necessary for a wife to tell off her husband in order to get her rights. A a d D
18. Mothers very often fell that they can't stand their children a moment longer. A a d D

19. A child should be taught always to come to his parents or teachers rather than fight when he is in trouble. A a d D

20. Having to be with children all the time gives a women the feeling her wings have been clipped. A a d D

21. Parents who start a child talking about his worries don't realize that sometimes it is better to leave well enough alone. A a d D

22. Husbands could do their part if they were less selfish. A a d D

23. A child should never keep a secret from parents. A a d D

24. Laughing at children's jokes and telling children jokes makes things go more smothly. A a d D

25. A child has a right to his own point of view and ought to be allowed to express it. A a d D

26. A child should be protected from jobs which might be too tiring or hard for him. A a d D

27. A wise parent will teach a child early who is boss. A a d D

28. Mothers never stip blaming themselves if their babies are injured in accidents. A a d D

29. No matter how well a married couple love one another differences occur which cause irritation and lead to arguments. A a d D

30. It is a rare mother who can be sweet tempered with her children all day. A a d D

31. There is no good excuse for a child hitting another child. A a d D

32. Most young mothers are bothered more by the feeling of being shut up in the home than by anything else. A a d D

33. Children may pester you with all their little upsets if you aren't careful in the beginning. A a d D

34. When a mother doesn't do a good job with children, it's probably because the father doesn't do his part around the house. A a d D

35. An alert parent should try to learn all her child's thoughts. A a d D

36. Parents who are interested in hearing about their children's parties, dates and fun help them grow right. A a d D

37. A child's ideas should be seriously considered in making family decisions. A a d D

38. Parents should know better than to allow their children to be exposed to difficult situations. A a d D

39. Children need some of the natural meanness taken out of them. A a d D

40. Most mothers are fearful that they may hurt their child in handling him. A a d D

41. There are some things which just can't be settled by a mild discussion. A a d D

42. Raising children is a nerve-wracking job. A a d D

43. Children should not be encouraged to box or wrestle because it often leads to trouble or injury. A a d D

44. One bad thing about raising children is that you aren't free enough of the time to do just as you like. A a d D

45. If a child has upset feelings it is best to leave him alone and not make it look serious. A a d D

46. If mothers could get their wishes they would most often ask that their husband be more understanding. A a d D

47. A mother has a right to know everything going on in her child's life because her child is a part of her. A a d D

48. If parents would have fun with their children, the children would be more apt to take their advice. A a d D

49. When a child is in trouble he should know he will not be punished for talking about it to parents. A a d D

50. Children should be kept away from all hard jobs which might be discouraging. A a d D

51. It is sometimes necessary for the parents to break child's will. A a d D

52. A mother's greatest fear is that in a forgetful moment she might let something bad happen to the baby. A a d D

53. It's natural to have quarrels when two people who both have minds of their own get married. A a d D

54. It's natural for a mother to "blow her top" when children are selfish and demanding. A a d D

55. Most parents prefer a quiet child to a "scrappy" one. A a d D

56. A young mother feels "held down" because there are lots of things she wants to do while she is young. A a d D

57. The trouble with giving attention to children's problems is they usually just make up many stories to keep you interested. A a d D

58. Few men realize a mother needs some fun in life too. A a d D

59. It is a mother's duty to make sure she knows her child's innermost thoughts. A a d D

60. When you do things together, children feel close to you and can talk easier. A a d D

----------------------------end-----------------------------------

DE PAUL UNIVERSITY **PRE-SCHOOL EVALUATION**

SOCIO-ECONOMIC and EDUCATIONAL BACKGROUND
FORM — 7

					______ Socio Economic
					______ Education, mother
					______ Occupation, mother's family
					______ Education, father
					______ Information
					______ Group member
					______ Special room for child's materials
					______ Child-scaled furniture
					______ Orderly placement
					______ Pre-school materials
					______ Handling of materials
					______ Deliberate presentation of materials
					______ Child treated with respect
					______ Mother a reader
					______ Musical instruments
					______ Plays or concerts attended
					______ Magazines subscribed to
					______ Musical preference (nt)
					______ Art (nt)
					______ Benefit from pre-school
					______ Behavior and growth affect
					______ Home implements
					______ Pre-school standards reflected
					______ Favorable attitude for learning
					______ Mental and Physical energies channeled constructively

FORM 7

1. Socio-economic background of family

1	2	3	4	5
Low	Low Middle	Middle	Middle High	Upper

2. Educational background of mother

1	2	3	4	5
High School	Some College	College Degree	Degree+ graduate	Graduate degree

3. Occupational level of mother's family

1	2	3	4	5
Employed	Employed under 12 persons	Employs over 12	Executive	Profession

4. Educational background of father

1	2	3	4	5
High School	Some college	College degree	Degree+ graduate	Graduate degree

(5.) Parents are well informed on Montessori Method, have read books...

1	2	3	4	5
No	Little Information	Some Information	Well Informed	Very Knowledgable

(6.) Parents have attended or are members of Montessori study group

1	2	3	4	5

7. Parents provide a special room for children's materials

1	2	3	4	5
no				yes

8. Child-scaled furniture is provided for child

1	2	3	4	5
no				yes

9. Orderly placement and replacement of children's materials expected

1	2	3	4	5
no	Seldom	Sometimes	Usually	Always

10. Some Montessor-pre-school materials are provided for the child.

1	2	3	4	5
No				Yes

11. Montessori (Preschool) handling of materials is expected of child

1	2	3	4	5
NO				Yes

12. Materials are presented to child after careful deliberation on the part of the parents as to the needs of the child.

1	2	3	4	5
NO	Seldom	Sometimes	Usually	Always

13. Child is treated with respect due a person.

1	2	3	4	5
NO				Always

14. Mother is a reader.

1	2	3	4	5
No				Profuse

15. Musical instruments in home--music appreciation.

1	2	3	4	5
No				Many

16. Plays or concerts attended in past year.

1	2	3	4	5
No				Many

17. Parents subscribe to magazines in the home.

1	2	3	4	5
No	Poor Quality	Medium Quality	Good Quality	Quality

18. Parent's preference for music.

1	2	3	4	5
No	Popular	Popular Semi-Classical	Semi-Class. Classical	Classical

19. Nature of art in the home. (sculpture, original paintings,prints

1	2	3	4	5

20. Parents feel child has benefited from Montessori school (presch

1	2	3	4	5
No	Little	Somewhat	Much	Very

21. Parents feel that child benefited from attendance at Montessori--Preschool. Attendance affected child's behavior and growth.

1	2	3	4	5
No	Little	Somewhat	Much	Very much

22. Child's home implements Montessori principles.

1	2	3	4	5
No	Little	Somewhat	Much	Very much

23. Montessori standards (i.e. ways of doing things) are reflected in Child's standards.

1	2	3	4	5
No	Little	Somewhat	Much	Very much

24. Parents feel child has a favorable attitude and readiness toward learning as a result of [Montessori--Preschool].

1	2	3	4	5
No	Little	Somewhat	Much	Very much

25. Parents feel child's mental and physical energies have been guided or channeled toward constructive use.

1	2	3	4	5
No	Little	Somewhat	Much	Very much

- -

COMMENTS:

The 25 questions above are not asked and recorded during the interview. These questions are in the form of a structured interview. Some items are judged from the interviewers observation of the home and are never asked.

Certain questions do not become part of the overall evaluation. Questions: 5,6,18,19,22 and 23.

Certain questions are split with Montessori School interchanged with the non-montessori school.

CHILD:____________________ ☐ Control ☐ Experimental #_____

Interview with ☐ Mother ☐ Father ☐ Both

Ability to observe home:______________________________

APPENDIX- B

APPENDIX -- B

Matching Variables for Experimental and Control Groups (Phase I)*

1. SEX

Experimental	13 male		
	8 female	Total 21 S	
Control	12 male		
	9 female	Total 21 S	

2. AGE

Experimental
mean age 4.38 years range 3 yrs.3mo.-4yrs.11mo.

Control
mean age 4.41 years range 3 yrs.11mo.-4yrs.10mo.

3. POSITION IN FAMILY (oldest first)

EXPERIMENTAL GROUP MEAN POSITION 1.62
BOYS: 1.61 GIRLS: 1.63

CONTROL GROUP MEAN POSITION 1.66
BOYS: 1.66 GIRLS: 1.66

4. NUMBER OF SIBLINGS IN FAMILY

Experimental Group	1.76 MEAN RANGE 0-3
Control Group	1.48 MEAN RANGE 0-3

5. RATING OF SOCIO-ECONOMIC LEVEL (scale 1-6)

Experimental Group	3.66 MEAN RANGE 3-5
Control Group	3.76 RANGE 3-5

---

*Except for I.Q. Scores which are presented graphically in Chapter 2.

6. HEALTH OF CHILD (rating of 1-3)

Experimental Group 2.33 MEAN
RANGE 2-3

Control Group 2.52 MEAN
RANGE 2-3

7. DISPOSITION OF CHILD (rating of 1-3)

Experimental Group 2.33 MEAN

Control Group 2.52 MEAN

8. ABILITY TO LEARN (rating of 1-3)

Experimental Group 2.57 MEAN

Control Group 2.48 MEAN

9. FATHERS AGE-- MOTHERS AGE

Experimental Group
Father 35.0 yrs. Range 50-26
Mother 32.33yrs. Range 42-26

Control Group
Father 34.05yrs. Range 45-26
Mother 31.57yrs. Range 45-26

Difference--Fathers Exp.95 + years over control
Difference--Mothers Exp.76 + years over control

10. FATHERS EDUCATION--MOTHERS EDUCATION

Experimental Group
Fathers MEAN Educ.17.38 yrs. RANGE 12-22 yrs.
Mothers MEAN Educ.15.71 yrs. RANGE 12-19 yrs.

Control Group
Fathers MEAN Educ.16.62 yrs. RANGE 12-20 yrs.
Mothers MEAN Educ.14.76 yrs. RANGE 12-16 yrs.

Difference: Exp. Fathers + .76years over Control
Difference: Exp. Mothers + .95years over Control

11. FATHERS OCCUPATION--Social Class Position and Prestige Rating.

Two different ratings were used to establish comparability of groups. First, the Revised Occupational Rating Scale* from W.L. Warner's, et.at., Index of Status Characteristics. Second, the Hatt-North Occupational Prestige Ratings.**

The authors wanted to establish social class position by use of a simple method, but one that would produce a high degree of predictive efficiency. The Warner Occupational Scale was chosen as the prime predictor of social class position. Results of the ratings are indicated on the following page. In general the results show that the experimental group mean was 1.47 and the control group mean was 1.57.

Next the occupations of the fathers were compared with those appearing in the Hatt-North Occupational Prestige ratings. The results showed that the experimental group had a mean prestige rating of 83.28 and the control group had a mean prestige rating of 82.71. The average rating on the Hatt-North Ratings was 69.9 indicating again that the fathers of both groups in this study were in higher-than average occupations.

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*W. Lloyd Warner, Marchia Meeher, and Kenneth Eells, Social Class in America (Chicago: Science Research Associates, 1949), pp. 121-59. (Scale found on page 140-141)

**Paul K. Hatt and C.C. North, "Jobs and Occupations: A Popular Eval.," Opinion News (September,1947), pp. 3-13.

CONTROL AND EXPERIMENTAL GROUP FATHER'S OCCUPATIONS

WARNER, MEEKER, EELLS'S REVISED SCALE FOR RATING OCCUPATIONS

	A		B		C		D		E	
	PROFESSIONALS		PROPRIETORS MANAGERS		BUSINESS MEN		CLERKS KINDRED		MANUAL WORKERS	
VALUE	C	E	C	E	C	E	C	E	C	E
1	3	9	1	1	7	5	—	—	—	—
2	-	1	-	—	1	-	7	2	—	—
3	2	2	-	-	—	-	—	-	—	—
4			-	—	-	-	-	—	-	1
5									—	—
6									—	—
7									—	—

NUMBER OF FATHERS = 21/C & 21/E

TOTAL RATINGS —— 33/C & 31/E

$\bar{X}$ = 1.47/E $\bar{X}$ = 1.57/C

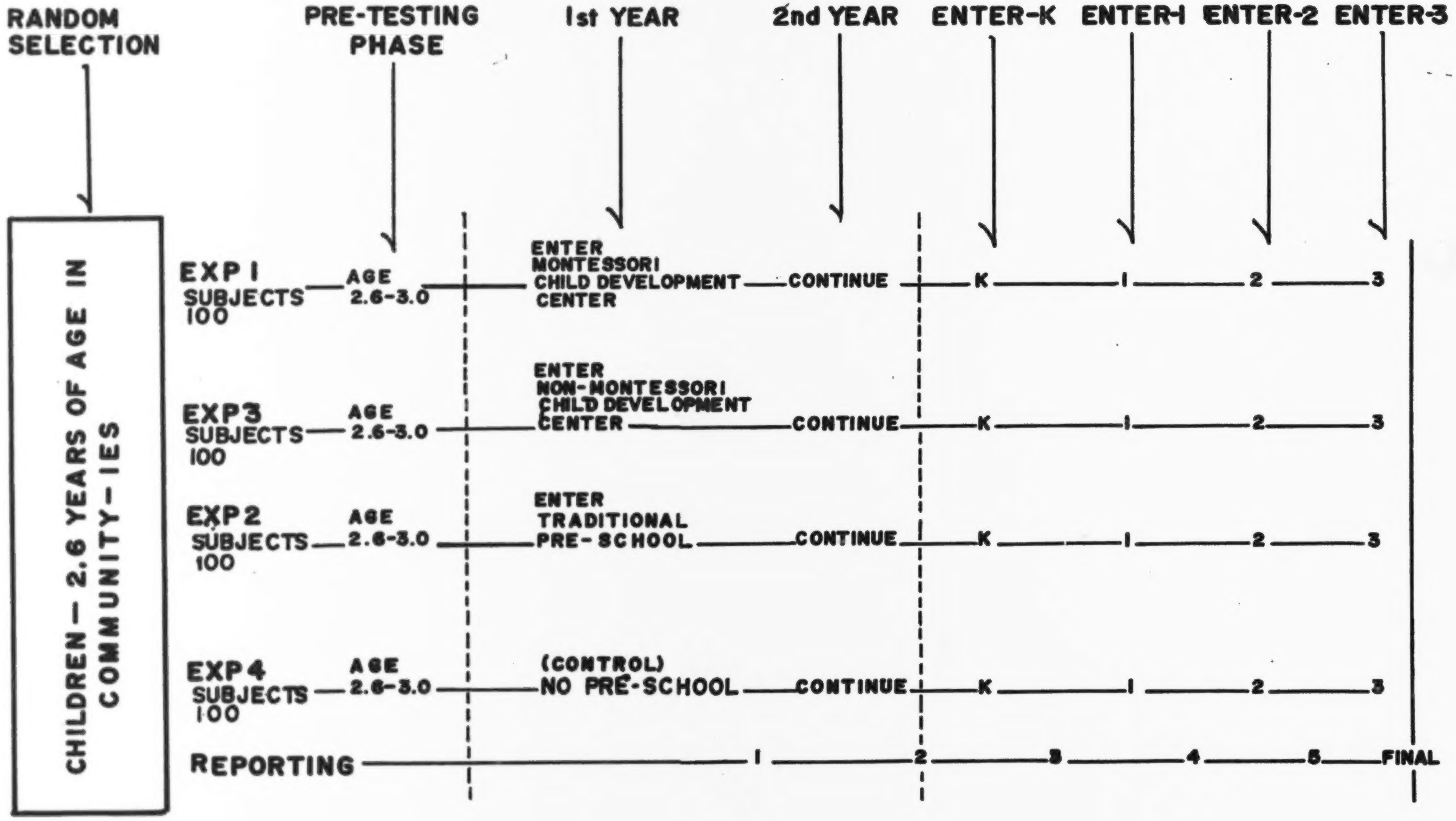
12. MOTHERS OCCUPATIONS

Mothers occupations were not rated since 17 control and 15 experimental group mothers reported that they were "housewives" and did not refer to their previous occupations. From reported educational levels (Cf. item 10 above) it would seem that most had two or more years of college training.

Those mothers not listing themselves as housewives reported the following occupations:

1 - Singer, 3 - Teachers, 1 - Psychologist,
2 - Registered Nurses, and 2 Business women.

SUGGESTED PLAN FOR FURTHER STUDY


RANDOM SELECTION
PRE-TESTING PHASE
1st YEAR
2nd YEAR
ENTER-K
ENTER-1
ENTER-2
ENTER-3
CHILDREN — 2.6 YEARS OF AGE IN COMMUNITY-IES
EXP 1 SUBJECTS 100
AGE 2.6-3.0
ENTER MONTESSORI CHILD DEVELOPMENT CENTER
CONTINUE
K
1
2
3
EXP 3 SUBJECTS 100
AGE 2.6-3.0
ENTER NON-MONTESSORI CHILD DEVELOPMENT CENTER
CONTINUE
K
1
2
3
EXP 2 SUBJECTS 100
AGE 2.6-3.0
ENTER TRADITIONAL PRE-SCHOOL
CONTINUE
K
1
2
3
EXP 4 SUBJECTS 100
AGE 2.6-3.0
(CONTROL) NO PRE-SCHOOL
CONTINUE
K
1
2
3
REPORTING
1
2
3
4
5
FINAL

RELIABILITY OF OUTCOMES RATING SCALE
(Form 4)

TRAIT ON RATING SCALE	STABILITY		RELIABILITY	
	Corr.	Sig.	Corr.	Sig.
Attitude Questions 1 and 2	.536	.01	.315	.05
Behavioral Characteristics Questions 3,4,5,6,7	.971	.01	.808	.01
Work Habits Questions 8,9,10,11	.936	.01	.823	.01
Motor Coordination Questions 12,13,14,15	.624	.01	.380	.05
Sensory Acuity Questions 16,17,18	.561	.01	.613	.01
Language Skills Questions 19,20,21,22	.876	.01	.884	.01
Mathematics Questions 23,24,25	.674	.01	.747	.01
Creativity-Imagination Questions 26 and 27	.484	.01	.714	.01
Number Activities Reading Activities Writing Activities	.959	.01	.896	.01

NOTE:

1. The same group of 40 children were used in all three ratings.
2. Teacher J-1 and Teacher H rated the children at the same time.
3. Same rating forms were used in each rating.
4. Both teachers were equally familiar with children rated.
5. Stability rating figured from teacher J-1 rating once and rerating 3 weeks later the same group of children.